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Sam Jones

FIFTLETH ANNUAL REPORT

OF THE

Indiana State Board of Agriculture

VOLUME XLII—1900-1901

INCLUDING THE

*Proceedings of the Annual Meeting, 1901; Reports of County and District Societies, State
Meetings of Swine Breeders, Wool Growers, Corn Growers' Association,
Farmers' Institutes, Experiment Station, Farmers' Insurance
Union, Statistics on Vegetables and Cereals,
State Dairy Association, etc., etc.*

TO THE GOVERNOR.

INDIANAPOLIS:

WM. B. BURFORD, CONTRACTOR FOR STATE PRINTING AND BINDING.
1901.

THE STATE OF INDIANA,
EXECUTIVE DEPARTMENT,
August 23, 1901. }

Received by the Governor, examined and referred to the Auditor of State for verification of the financial statement.

OFFICE OF AUDITOR OF STATE,
INDIANAPOLIS, August 23, 1901. }

The within report, so far as the same relates to moneys drawn from the State Treasury, has been examined and found correct.

W. H. HART,
Auditor of State.

INDIANAPOLIS, August 23, 1901.

Returned by the Auditor of State, with above certificate, and transmitted to Secretary of State for publication, upon the order of the Board of Commissioners of Public Printing and Binding.

CHAS. E. WILSON,
Private Secretary.

Filed in the office of the Secretary of State of the State of Indiana, August 23, 1901.

UNION B. HUNT,
Secretary of State.

Received the within report and delivered to the printer this 23d day of August, 1901.

THOS. J. CARTER,
Clerk Printing Bureau.

MEMBERS
OF THE
Indiana State Board of Agriculture
1900.

- 1st District—JOHN C. HAINES, Rockport, Spencer County.
2d District—MASON J. NIBLACK, Vincennes, Knox County.
3d District—W. W. STEVENS, Salem, Washington County.
4th District—E. A. ROBISON, Franklin, Johnson County.
5th District—H. L. NOWLIN, Guilford, Dearborn County.
6th District—KNODE PORTER, Hagerstown, Wayne County.
7th District—H. B. HOWLAND, Howlands, Marion County.
8th District—SID CONGER, Shelbyville, Shelby County.
9th District—W. T. BEAUCHAMP, Terre Haute, Vigo County.
10th District—JOHN L. DAVIS, Crawfordsville, Montgomery County.
11th District—M. S. CLAYPOOL, Muncie, Delaware County.
12th District—MORTIMER LEVERING, Lafayette, Tippecanoe County.
13th District—JOHN L. THOMPSON, Gas City, Grant County.
14th District—COTT BARNETT, Logansport, Cass County.
15th District—AARON JONES, South Bend, St. Joseph County.
16th District—JAS. E. McDONALD, Ligonier, Noble County.
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OFFICERS FOR 1900.

AARON JONES, *President.*

JOHN C. HAINES,
Vice-President.

HIRAM B. HOWLAND,
General Superintendent.

CHARLES DOWNING,
Secretary.

J. W. LAGRANGE,
Treasurer.

Executive Committee.

MESSRS. STEVENS, BEAUCHAMP, ROBISON, THOMPSON.

BOARD OF AGRICULTURE.

A TABLE SHOWING THE OFFICERS, PLACE AND PREMIUMS PAID OF EACH FAIR HELD BY THE STATE BOARD OF AGRICULTURE.

Year.	President.	Secretary.	Treasurer.	General Superintendent.	Place of Fair.	Premiums Paid.
1852	Gov. Joseph A. Wright.	John B. Dillon	Royal Mayhew	W. T. Dennis	Indianapolis.	
1853	Gov. Joseph A. Wright	John B. Dillon	Royal Mayhew	J. J. Bingham	Lafayette	
1854	Gov. Joseph A. Wright	Wm. T. Dennis	Royal Mayhew	W. T. Dennis	Madison	
1855	Gen. Joseph Orr	John B. Dillon	S. A. Buell	Calvin Fletcher, Jr.	Indianapolis.	\$2,753 00
1856	Dr. A. C. Stevenson	Ignatius Brown	S. A. Buell	Calvin Fletcher, Jr.	Indianapolis.	4,225 00
1857	Dr. A. C. Stevenson	Ignatius Brown	S. A. Buell	Calvin Fletcher, Jr.	Indianapolis.	4,127 00
1858	Dr. A. C. Stevenson	John B. Dillon	Thomas H. Sharp	Calvin Fletcher, Jr.	Indianapolis.	
1859	George D. Wagner	John B. Dillon	Thomas H. Sharp	James L. Bradley	New Albany	6,103 00
1860	George D. Wagner	Wm. T. Dennis	Thomas H. Sharp	James L. Bradley	Indianapolis.	3,827 00
1861	D. P. Holloway	Wm. T. Dennis	H. A. Fletcher		No Fair	
1862	James D. Williams	W. H. Loomis	H. A. Fletcher	J. A. Grosvenor	Indianapolis.	3,964 00
1863	A. D. Hamrick	W. H. Loomis	H. A. Fletcher	J. A. Grosvenor	Indianapolis.	
1864	Stearns Fisher	W. H. Loomis	Francis King	W. H. Loomis	Indianapolis.	4,121 00
1865	Stearns Fisher	W. H. Loomis	Carlos Dickson	J. A. Grosvenor	Fort Wayne	4,078 00
1866	Stearns Fisher	W. H. Loomis	Carlos Dickson	J. A. Grosvenor	Indianapolis.	
1867	A. D. Hamrick	A. J. Holmes	Carlos Dickson	J. B. Sullivan	Terre Haute	6,331 00
1868	A. D. Hamrick	A. J. Holmes	Carlos Dickson	J. B. Sullivan	Indianapolis.	7,087 00
1869	A. D. Hamrick	A. J. Holmes	Carlos Dickson	J. B. Sullivan	Indianapolis.	7,517 00
1870	J. D. Williams	Joseph Poole	Carlos Dickson	J. S. Benson	Indianapolis.	7,914 00
1871	J. D. Williams	Joseph Poole	Carlos Dickson	Jacob Mutz	Indianapolis.	8,564 00
1872	John Sutherland	Alex. Herron	Carlos Dickson	H. W. Caldwell	Indianapolis.	9,619 20
1873	John Sutherland	Alex. Herron	Carlos Dickson	H. W. Caldwell	Indianapolis.	8,864 75
1874	John Sutherland	Alex. Herron	Carlos Dickson	E. J. Howland	Indianapolis.	12,068 20
1875	William Crimt	Alex. Herron	Carlos Dickson	E. J. Howland	Indianapolis.	10,754 00
1876	Hezekiah Caldwell	Alex. Herron	Carlos Dickson	J. L. Hanna	Indianapolis.	8,179 30
1877	Jacob Mutz	Alex. Herron	Carlos Dickson	J. W. Furnas	Indianapolis.	6,537 95
1878	W. B. Seward	Alex. Herron	Carlos Dickson	R. M. Lockhart	Indianapolis.	5,657 00
1879	Robert Mitchell	Alex. Herron	Carlos Dickson	R. M. Lockhart	Indianapolis.	5,472 00
1880	W. H. Ragan	Alex. Herron	J. A. Wildman	Fielding Beeler	Indianapolis.	6,653 00
1881	R. M. Lockhart	Alex. Herron	J. A. Wildman	Fielding Beeler	Indianapolis.	6,355 50
1882	H. C. Meredith	Alex. Herron	J. A. Wildman	Fielding Beeler	Indianapolis.	8,006 00
	L. B. Ouster					

1883	Robert Mitchell	Alex. Herron	J. A. Wildman	Fielding Beeler	Indianapolis	\$9,681 15
1884	Robert Mitchell	Alex. Herron	S. Johnson	Fielding Beeler	Indianapolis	10,414 80
1885	R. M. Lockhart	Alex. Herron	S. Johnson	Fielding Beeler	Indianapolis	9,000 60
1886	W. B. Seward	Alex. Herron	S. Johnson	H. B. Stout	Indianapolis	9,419 00
1887	W. B. Seward	Alex. Herron	S. Johnson	C. E. Merrifield	Indianapolis	9,728 60
1888	J. N. Davidson	Alex. Herron	S. Johnson	R. M. Lockhart	Indianapolis	9,917 50
1889	J. N. Davidson	Alex. Herron	S. Johnson	C. E. Merrifield	Indianapolis	10,200 00
1890	W. A. Banks	Alex. Herron	S. Johnson	C. E. Merrifield	Indianapolis	13,040 60
1891	W. A. Banks	Leon T. Bagley	S. Johnson	C. E. Merrifield	Indianapolis	15,297 00
1892	J. M. Borge	Leon T. Bagley	S. Johnson	E. H. Peed	Indianapolis	19,876 00
1893	V. K. Officer	Chas. F. Kennedy	J. A. Wildman	E. H. Peed	Indianapolis	18,407 60
1894	J. M. Sankey	Chas. F. Kennedy	E. J. Robison	E. H. Peed	Indianapolis	18,516 70
1895	J. M. Sankey	Chas. F. Kennedy	E. J. Robison	E. H. Peed	Indianapolis	17,581 98
1896	W. W. Hamilton	Chas. F. Kennedy	E. J. Robison	E. H. Peed	Indianapolis	14,817 17
1897	C. B. Harris	Chas. F. Kennedy	E. J. Robison	E. H. Peed	Indianapolis	19,296 88
1898	Charles Downing	Chas. F. Kennedy	E. J. Robison	John L. Thompson	Indianapolis	11,113 33
1899	W. W. Stevens	Chas. F. Kennedy	J. W. Lagrange	E. B. Howland	Indianapolis	17,107 11
1900	Aaron Jones	Charles Downing	J. W. Lagrange	E. B. Howland	Indianapolis	16,125 75
1901	J. E. McDonald	Charles Downing	J. W. Lagrange	E. H. Peed	Indianapolis	

*Henry C. Meredith died July 5, 1892, and the Vice-President, L. B. Custer, served the unexpired term.

**LIST OF MEMBERS OF INDIANA STATE BOARD OF AGRICULTURE,
SHOWING DATE AND TERM OF SERVICE.**

NAME.	COUNTY.	FIRST ELECTED.	NO. YEARS SERVED.
Allen, Joseph.....	Montgomery.....	1853	2
Banks, W. A.....	Laporte.....	1882	12
Barnes, John P.....	Madison.....	1879	4
Barnett, Cott.....	Cass.....	1898	3
Basler, F.....	Sullivan.....	1872	2
Bennett, Wm. H.....	Union.....	1854	7
Bennett, Wm. H.....	Union.....	1863	2
Berry, W. W.....	Knox.....	1889	3
Blackstock, Wm. M.....	Tippecanoe.....	1895	2
Blanche, Willis.....	Howard.....	1887	2
Boggs, John M.....	Tippecanoe.....	1885	8
Bonner, W. H.....	.....	1859	2
Bradley, James L.....	Johnson.....	1856	3
Branham, D. C.....	Jefferson.....	1861	2
Brown, Dr. R. T.....	Montgomery.....	1855	4
Brown, Geo. W.....	Shelby.....	1857	2
Burke, L. A.....	Posey.....	1870	5
Buskirk, Geo. A.....	Monroe.....	1870	2
Beauchamp, Wm. T.....	Vigo.....	1899	1
Bridges, John C.....	Putnam.....	1901	..
Caldwell, Hezekiah.....	Wabash.....	1867	12
Carr, John F.....	Jackson.....	1862	2
Claypool, A. B.....	Fayette.....	1871	8
Claypool, M. S.....	Delaware.....	1893	7
Clemens, B. F.....	Wabash.....	1889	2
Cockrum, Jas. W.....	Gibson.....	1853	2
Coffin, W. G.....	Vermillion.....	1859	4
Coffield, J. W.....	Ohio.....	1877	4
Collins, T. H.....	Floyd.....	1858	4
Cotteral, W. W.....	Henry.....	1883	2
Cox, E. T.....	Posey.....	1864	6
Crawford, George.....	Laporte.....	1862	2
Crim, Wm.....	Madison.....	1869	9
Custer, L. B.....	Cass.....	1878	10
Conger, Sid.....	Shelby.....	1900	1
Davis, John L.....	Montgomery.....	1895	5
Davidson, Stephen.....	Fulton.....	1870	8
Davidson, Jasper N.....	Montgomery.....	1883	12
Dennis, W. T.....	Wayne.....	1854	5
Donaldson, W. C.....	Parke.....	1863	8
Dowling, Thomas.....	Vigo.....	1871	4
Downing, Charles.....	Hancock.....	1893	8
Drake, James P.....	Marion.....	1864	2
Dume, George G.....	Lawrence.....	1851	2
Duncan, Wm.....	Lawrence.....	1858	4
Dungan, S. W.....	Johnson.....	1882	12
Durham, Thos.....	Vigo.....	1852	2

LIST OF MEMBERS, ETC.—Continued.

NAME.	COUNTY.	FIRST ELECTED.	NO. YEARS SERVED.
Emison, Samuel.....	Knox.....	1851	2
Fisher, Stearns.....	Wabash.....	1854	13
Fletcher, Calvin.....	Marion.....	1862	2
Franklin, W. M.....	Owen.....	1855	3
Freeman, A.....	Porter.....	1858	4
Gaar, J. M.....	Wayne.....	1865	2
Gerard, J. B.....	Dearborn.....	1873	2
Gilbert, Joseph.....	Vigo.....	1881	2
Graffe, Dr. G. B.....	Gibson.....	1855	5
Graham, John M.....	Delaware.....	1883	4
Greer, W. A.....	Dearborn.....	1885	3
Grosvenor, J. A.....	Marion.....	1864	2
Haines, John C.....	Lake.....	1896	4
Hamrick, A. D.....	Putnam.....	1859	14
Hamilton, W. W.....	Decatur.....	1891	6
Hancock, R. H.....	Harrison.....	1878	6
Hargrove, Samuel.....	Pike.....	1882	6
Harris, Chas. B.....	Elkhart.....	1892	6
Harris, Jacob R.....	Switzerland.....	1851	4
Hay, A. Y.....	Clark.....	1854	2
Haymonds Dr. Rufus.....	Franklin.....	1855	4
Haynes, R. P.....	Daviess.....	1875	8
Helm, Dr. Y. C.....	Delaware.....	1859	10
Herriot, Samuel.....	Johnson.....	1853	2
Herron, Alex.....	Fayette.....	1867	4
Holton, W. B.....	Marion.....	1894	2
Holloway, David P.....	Wayne.....	1851	4
Holloway, David P.....	Wayne.....	1861	2
Holmes, D. J. C.....	Delaware.....	1859	10
Howland, H. B.....	Marion.....	1892	2
Howland, H. B.....	Marion.....	1896	3
Huffstetter, David.....	Orange.....	1853	2
Hussey, George.....	Vigo.....	1851	1
Johnson, F. C.....	Floyd.....	1872	6
Jones, Aaron.....	St. Joseph.....	1894	6
Jones, Dick.....	Bartholomew.....	1883	8
Jones, Lloyd.....	Huntington.....	1889	4
Kelley, John B.....	Warrick.....	1851	2
Kirkpatrick, T. M.....	Howard.....	1881	2
Lagrange, J. W.....	Johnson.....	1894	4
Lane, George W.....	Dearborn.....	1852	8
LaTourette, Henry.....	Fountain.....	1883	4
Levering, John.....	Tippecanoe.....	1852	2
Levering, Mortimer.....	Tippecanoe.....	1897	4

LIST OF MEMBERS, ETC.—Continued.

NAME.	COUNTY.	FIRST ELECTED.	NO. YEARS SERVED.
Lockhart, R. M	Dekalb	1874	20
Loder, Isaac B	Rush	1861	4
Loomis, W. H	Allen	1861	4
Matson, J. A	Putnam	1854	1
Matthews, Claude	Vermillion	1897	2
Maze, W. A	Tipton	1891	4
Meredith, Henry C	Wayne	1879	4
Millhouse, J. V	Jennings	1875	2
Mitchell, Robert	Gibson	1875	21
Mitchell, Thos. V	Rush	1869	10
Morgan, Jessie	Rush	1852	2
Mutz, Jacob	Shelby	1868	14
McBride, Jeremiah	Martin	1851	3
McClung, J. A	Fulton	1888	4
McConnell, George N	Steuben	1860	2
McConnell, George N	Steuben	1864	6
McCoy, James S	Knox	1892	4
McCrea, John	Monroe	1864	6
McDonald, M. A	Warren	1893	2
McDonald, James E	Noble	1894	6
McMahan, John	Washington	1851	3
McWilliams, R. C	Parke	1881	2
Nelson, J. D. G	Allen	1853	6
Nelson, J. D. G	Allen	1870	4
Nelson, Thomas	Parke	1875	4
Nelson, Thomas	Parke	1889	2
Niblack, Mason J	Knox	1896	4
North, Benjamin	Ohio	1867	6
Nowlin, H. L	Dearborn	1897	4
Officer, V. K	Jefferson	1888	9
O'Neal, J. K	Tippecanoe	1881	2
Orr, Joseph	Laporte	1851	6
Peck, Henry	Cass	1862	2
Peed, E. H	Henry	1885	8
Piatt, Nathan	Warrick	1860	4
Porter, Knode	Wayne	1897	3
Poole, Joseph	Fountain	1861	12
Quick, S. R	Bartholomew	1879	4
Raab, D. G	Ohio	1856	5
Ragan, W. H	Putnam	1873	10
Ratliff, John	Grant	1883	4
Reese, D. E	Dearborn	1865	4
Reiter, Gerard	Knox	1888	1
Robison, E. A	Johnson	1898	3

LIST OF MEMBERS, ETC.—Continued.

NAME.	COUNTY.	FIRST ELECTED.	NO. YEARS SERVED.
Sample, H. P.	Tippecanoe.....	1873	8
Sankey, James M.	Vigo.....	1891	6
Shoemaker, John C.	Perry.....	1862	10
Seig, J. Q. A.	Harrison.....	1884	10
Seward, A.	Monroe.....	1851	2
Seward, W. B.	Monroe.....	1872	20
Seybold, Dempsey.....	Parke.....	1879	2
Simonton, Robert.....	Huntington.....	1887	2
Smith, Abraham.....	Knox.....	1853	2
Spalding, T. N.	Lagrange.....	1852	2
Stevenson, Alex. C.	Putnam.....	1851	3
Stevenson, Alex. C.	Putnam.....	1855	4
Stevens, W. W.	Washington.....	1894	6
Stewart, Charles B.	Tippecanoe.....	1883	2
Sunman, T. W. W.	Ripley.....	1881	4
Sutherland, John.....	Laporte.....	1864	18
Swinney, Thomas W.	Allen.....	1851	1
Thompson, John L.	Grant.....	1895	5
Thompson, S. H.	Jefferson.....	1864	3
Turner, John N.	Grant.....	1879	2
Tuttle, T. W.	Delaware.....	1876	1
Vawter, S.	Jennings.....	1855	3
Vinton, A. E.	Marion.....	1858	2
Wagner, G. D.	Warren.....	1854	7
Wiley, Lemuel.....	Switzerland.....	1863	1
Willard, Roland.....	Kosciusko.....	1851	2
Williams, James D.	Knox.....	1855	18
Wright, Joseph A.	Marion.....	1851	3

State Industrial Associations.

OFFICERS FOR 1900.

Indiana State Board of Agriculture—President, Aaron Jones, South Bend; Secretary, Charles Downing, Indianapolis.

Indiana Horticultural Association—President, C. M. Hobbs, Bridgeport; Secretary, James Troop, Lafayette.

Indiana Shorthorn Breeders' Association—President, E. Folsom, Indianapolis; Secretary, W. J. Quick, Brooklyn.

Indiana Dairymen's Association—President, J. J. W. Billingsly, Indianapolis; Secretary, H. E. Van Norman, Lafayette.

Indiana Wool Growers' Association—President, Sid. Conger, Flatrock; Secretary, J. W. Robe, Greencastle.

Indiana Swine Breeders' Association—President, J. B. Luyster, Franklin; Secretary, Allen Beeler, Liberty.

Indiana Poultry Breeders' Association—President, Frank Johnson, Howlands; Secretary, Jesse Tarkington, Indianapolis.

Indiana Farmers' Mutual Insurance Union—President, Aaron Jones, South Bend; Secretary, Joshua Strange, Marion.

Indiana Jersey Cattle Club—President, Dr. G. V. Woollen, Indianapolis; Secretary, W. S. Budd, Malott Park.

Indiana Corn Growers' Association—President, A. O. Lockridge, Greencastle; Secretary and Treasurer, H. F. McMahan, Fairfield.

Farmers' Institutes—Director, Prof. W. C. Latta, Purdue University, Lafayette.

Experiment Station—Director, Prof. C. S. Plumb, Purdue University, Lafayette.

State Chemist—Prof. H. A. Huston, Purdue University, Lafayette.

State Entomologist—Prof. James Troop, Purdue University, Lafayette.

THE Indiana State Board of Agriculture.

CONSTITUTION.

AS REVISED AND ADOPTED AT THE JANUARY MEETING OF THE BOARD, 1891.

ARTICLE 1. The name and style of this society shall be "The Indiana State Board of Agriculture," its objects, to promote and improve the condition of agriculture, horticulture, and the mechanic, manufacturing and household arts.

ART. 2. There shall be held in the city of Indianapolis, at such time as may be prescribed by law, an annual meeting of the State Board of Agriculture, together with presidents, or other delegates duly authorized, from each county, or such other agricultural society as may be authorized by law to send delegates, who shall, for the time being, be ex-officio members of the State Board of Agriculture, for the purpose of deliberation and consultation as to the wants, prospects and condition of the agricultural interests throughout the State; and at such annual meetings the several reports from county societies shall be delivered to the President of the State Board of Agriculture; and the said President and delegates shall, at this meeting, elect suitable persons to fill all vacancies in this Board: Provided, however, That said election shall not affect the members of the Board present, whose terms shall not be considered to expire until the last day of the session.

ART. 3. The State Board-elect shall meet immediately after the adjournment of the State Board, for the purpose of organization and for the transaction of such other business as the wants and interests of the society may require; and hold such other meetings from time to time, for making out premium lists, preparing for State Fairs, and all other business necessary to the promotion of the objects of the society.

ART. 4. The State Board-elect shall consist of sixteen members, chosen from the following districts:

- 1st District—Posey, Vanderburgh, Gibson, Warrick and Spencer counties.
- 2d District—Knox, Davless, Martin, Pike, Dubois, Crawford and Perry counties.
- 3d District—Harrison, Washington, Orange, Floyd, Clark and Scott counties.
- 4th District—Jackson, Lawrence, Brown, Monroe, Greene, Owen, Johnson and Sullivan counties.
- 5th District—Jefferson, Switzerland, Ohio, Dearborn, Franklin, Ripley, and Jennings counties.
- 6th District—Bartholomew, Decatur, Rush, Fayette, Union and Wayne counties.
- 7th District—Madison, Hancock, Hamilton, Henry and Shelby counties.
- 8th District—Marion County.
- 9th District—Clay, Vigo, Parke, Vermillion and Fountain counties.
- 10th District—Putnam, Morgan, Hendricks, Montgomery and Boone counties.
- 11th District—Delaware, Randolph, Jay, Adams, Wells, Huntington and Blackford counties.
- 12th District—Carroll, White, Benton, Newton, Tippecanoe, Warren, Jasper and Pulaski counties.
- 13th District—Clinton, Tipton, Howard, Grant, Wabash, and Whitley counties.
- 14th District—Elkhart, Kosciusko, Fulton, Cass and Miami counties.
- 15th District—St. Joseph, Marshall, Starke, Laporte, Porter and Lake counties.
- 16th District—Allen, Dekalb, Steuben, Lagrange and Noble counties.

Chosen for two years, one-half of whose terms expire every year, to wit: Those representing the first, second, third, fourth, seventh, fourteenth, fifteenth and sixteenth districts expire at the annual meeting of 1860, and those representing the fifth, sixth, eighth, ninth, tenth, eleventh, twelfth and thirteenth districts expire at the annual meeting to be held in January, 1861. To be chosen by ballot.

ART. 5. It shall be the duty of the President to preside at all meetings, conduct the business in an orderly and parliamentary manner, and officially sign all vouchers and drafts upon the Treasurer (except for premiums), and all other instruments requiring the same, and call special meetings in cases of emergency.

ART. 6. The State Board-elect shall, at the annual meeting after the adjournment of the delegate meeting, proceed to elect one of their number President, who shall hold his office for a term of one year, and until

his successor is elected and qualified; and one of their number for Vice-President, whose term shall be the same as President, who shall act, and for the time being have all the power, as President, whenever the President is absent from any regular meeting. They shall also elect some suitable person as Secretary and some suitable person as Treasurer, and a General Superintendent, who shall hold their offices each for one year, unless removed for incompetency or neglect of duty. They shall also elect four of their number who shall, with the President, constitute an Executive Committee, who shall have power to act in cases of emergency, where loss would result by waiting till a regular meeting of the Board, but shall have no power whatever during a meeting of the Board.

ART. 7. It shall be the duty of the Treasurer to safely keep the funds belonging to the society, pay out the same on orders or drafts drawn by the Secretary, and report annually to the State Board, and as much oftener as he may be called upon by the Board, and shall give bond for the faithful performance of his duties.

ART. 8. It shall be the duty of the General Superintendent to take care of and carefully keep all property belonging to the society, have the care and control of the Fair Grounds during the recess; have the supervision and oversight of such improvements or additions as may be directed by the State Board, and, under their direction, procure materials, contract for labor, and shall be, during the continuance of the Fair, the Chief Marshal and head of the police. The members of the Board shall employ all the necessary police and gatekeepers.

ART. 9. The Secretary shall keep a true record of the proceedings. He shall conduct all correspondence on behalf of the society, except when otherwise directed by the President. He shall, by himself and assistants by him appointed, arrange the details of the entries, tickets and enroll the names of committees and judges of the State Fair, receive and record the various reports of the awarding committees, fill out and deliver all diplomas and certificates. It shall be the duty of the Secretary to condense the County Agricultural reports for each year into one volume and superintend the publishing of the same. He shall audit and file all accounts against the Board; draw orders in favor of the proper persons on the Treasurer for the amount; but orders shall not be drawn payable to order or bearer, but to the name of the party alone or his agent. He shall make an annual report, showing amount of all orders upon the treasury, and shall perform such other duties as the best interests of the society may demand; but he is at all times subject to the direction and control of the State Board.

ART. 10. At the annual meeting of the Board the salaries of the Treasurer, Secretary and Superintendent shall be fixed for the ensuing year; Provided, That said Board may, in their discretion, at any meeting of said Board, make said officers an additional allowance for extra services.

ART. 11. That no compensation shall be allowed to delegates attending the annual meetings of the State Board; nor shall the members of the State Board-elect be paid any sum of money, as compensation or otherwise, except by order of the Board-elect.

ART. 12. The State Board may adjourn from time to time, or they may be called together by the Secretary, by order of the President, by a written notice to each member, enclosed by mail, and a notice of such meeting published in two or more newspapers of general circulation, in the city of Indianapolis; and all meetings so held by adjournment, or calls, shall be deemed regular and legal.

ART. 13. Any alteration or amendment to this Constitution may be made at the annual meeting of the State Board, two-thirds of all the members voting for such amendment.

ART. 14. The following standing committees shall be appointed by the President, to whom all matters of business coming up for reference under their particular heads shall be referred, unless otherwise specially directed by the Board:

1. Finance and Claims.
2. Rules and Regulations.
3. Fair Grounds.
4. Unfinished Business.
5. Geological Survey—Executive Committee, ex-officio.
6. Premium List.

AMENDMENTS TO THE CONSTITUTION.

At the May meeting in 1851, certain rules, embracing ten sections, for the government of county agricultural societies, were adopted by the Board of Agriculture, as required in Section 1 of the statute laws enacted by the Legislature of Indiana for the "Encouragement of Agriculture," approved February 17, 1852.

At the February meeting of 1868 the rules were found inexpedient and were repealed, and the following resolutions, submitted by the Committee on Rules and Regulations, were adopted:

Resolved, That all county and district societies shall be organized and governed by the laws of the State of Indiana in regard to agricultural societies, and especially under the act passed by the Legislature and approved February 17, 1852.

Resolved, That all societies so organized will be entitled to send delegates to this Board (State Board of Agriculture) at its annual meetings, and will be received and acknowledged upon the presentation of their reports and credentials, and compliance with the laws as legally organized societies.

THE

Indiana State Board of Agriculture.

A RESUME OF WORK FOR 1900.

REORGANIZATION OF THE BOARD.

January 3, 1901.

Upon call of the President the Indiana State Board of Agriculture convened in the room of the Secretary. All members present and W. W. Stevens presiding.

The allowance for the services for clerk of the Art Building to the Secretary was presented by the President, and upon motion of Mr. Jones his action in making such allowance was approved.

There being no further business the President declared the Indiana State Board of Agriculture ready for reorganization, and adjourned sine die.

CHAS. F. KENNEDY,
Secretary.

The holdover members and the members-elect assembled in the office of the Secretary of the Board, and upon motion of Mr. Niblack, Mr. Stevens was chosen chairman and Mr. Kennedy secretary.

The motion of Mr. McDonald that the members proceed to the election of officers without nomination prevailed.

The Chair appointed tellers and directed the first ballot for President of the Board to proceed.

First ballot.—Aaron Jones, of St. Joseph County, received eight votes and John C. Haines, of Spencer County, eight votes. The Chairman declared no election and directed the second ballot to proceed.

The second, third and succeeding to the thirteenth ballot with no change in the vote from the first ballot.

The fourteenth to the seventeenth ballots inclusive resulted: Mr. Jones, eight votes; Mr. Haines, seven votes, and Mr. McDonald, one vote.

Eighteenth ballot.—Mr. Jones, eight votes; Mr. Haines, five votes; Mr. McDonald, one vote; Mr. Claypool, one vote, and Mr. Levering, one vote.

Nineteenth and twentieth ballots.—Mr. Jones, eight votes; Mr. Haines, seven votes, and Mr. McDonald, one vote.

Twenty-first ballot.—Mr. Jones, eight votes; Mr. Haines, seven votes; Mr. Niblack, one vote.

Twenty-second ballot.—Mr. Jones, eight votes; Mr. Haines, six votes, and Mr. Niblack, two votes.

Twenty-third and twenty-fourth ballots.—Mr. Jones, eight votes; Mr. Haines, seven votes; Mr. Niblack, one vote.

Motion of Mr. Beauchamp that a recess of ten minutes be taken prevailed.

Twenty-fifth and twenty-sixth ballots.—Mr. Jones, eight votes; Mr. Haines, seven votes; Mr. Niblack, one vote.

Twenty-seventh to thirty-first ballot.—Mr. Jones, eight votes; Mr. Haines, eight votes.

Thirty-second ballot.—Mr. Jones, eight votes; Mr. Haines, seven votes, and Mr. Porter, one vote.

Thirty-third ballot.—Mr. Jones, eight votes; Mr. Haines, eight votes.

Thirty-fourth ballot.—Mr. Jones, eight votes; Mr. Haines, seven votes, and Mr. Thompson, one vote.

On motion of Mr. Niblack a recess of ten minutes was taken.

Thirty-fifth ballot.—Mr. Jones, eight votes; Mr. Haines, seven votes, and Mr. Levering, one vote.

Mr. Haines asked the privilege of the floor, thanked the members for the support he had received and withdrew his name.

The motion of Mr. McDonald that the Secretary cast sixteen votes for Mr. Jones, prevailed. Which done, the Chair declared Mr. Aaron Jones duly elected President of the Board for the ensuing year.

The motion of Mr. Thompson that the Secretary be instructed to cast sixteen votes for Mr. John C. Haines for Vice-President prevailed, and when done the Chair declared Mr. Haines duly elected Vice-President of the Board for the ensuing year.

The motion of Mr. Howland that the Secretary be instructed to cast sixteen votes for Mr. Charles Downing for Secretary of the Board prevailed. Which done, the Chairman declared Mr. Downing duly elected Secretary for the ensuing year.

The motion of Mr. McDonald that Mr. J. W. Lagrange receive the vote of all the members for Treasurer of the Board and that the Secretary cast sixteen votes for him prevailed. The Secretary having cast the vote as directed, the Chairman declared Mr. J. W. Lagrange duly elected Treasurer for the ensuing year.

Mr. Downing asked the privilege of the floor, which granted, thanked the members for honoring him by electing him Secretary of the Board and tendered his resignation as member of the Board, to take effect at its pleasure.

The motion of Mr. Levering that the Board recommend the appointment by the Governor of Mr. M. S. Claypool as member of the Indiana Live Stock Sanitary Commission to succeed himself prevailed without dissent.

The motion of Mr. Nowlin that the matter of borrowing money to liquidate the debts of the Board be referred to the Executive Committee prevailed.

The motion of Mr. Niblack that the Board adjourn prevailed.

CHAS. F. KENNEDY,
Secretary.

MEETING OF INDIANA STATE BOARD OF AGRICULTURE, JANUARY 31.

Minutes of the meeting of the Indiana State Board of Agriculture held on the 31st day of January, 1900.

The meeting of the Indiana State Board of Agriculture was called to order by Hon. Aaron Jones, President.

All members of the Board were present except Mr. Levering.

On motion, duly seconded, the reading of the minutes of the Board was dispensed with, and Mr. Kennedy, the former Secretary, was given further time in which to complete the same.

Mr. Charles Downing, member of the Board from the Eighth District, presented his resignation as a member of the Board, which reads as follows:

"To the Members of the Indiana State Board of Agriculture:

"Gentlemen—Having been elected Secretary of the Indiana State Board of Agriculture, for the ensuing year, I hereby tender to you my resignation as a member of said Indiana State Board of Agriculture.

"Very respectfully,

"CHARLES DOWNING."

On motion of Mr. Niblack, duly seconded, the resignation of Mr. Downing was accepted.

On motion of Mr. Robison, the election of a member of the Board to fill the vacancy of Mr. Downing was fixed for 11 o'clock a. m. and was made a special order for that time.

On motion of Mr. Stevens, duly seconded, it was ordered that all bills for advertising the Fair for 1899 be settled by the Secretary.

On motion the following bills were allowed:

H. B. Howland.....	\$15 25
Crawfordsville Journal	2 00
Middletown News	1 00
Mary J. Burke.....	15 00
Bridgeport Nurseries	10 50
Western Union Telegraph Company.....	95
Geo. R. Browning.....	1 00
Charles Downing.....	10 65
Knight & Jillson.....	11 16
W. B. Burford.....	95
American Express Company.....	3 25
Adams Express Company.....	9 82
Logansport Pharos	2 00

On motion of Mr. Niblack the amount of the bond of the Treasurer was fixed at \$25,000, and the Secretary's bond was fixed at \$5,000.

Mr. Stevens moved to amend said motion by fixing the amount of the Treasurer's bond at \$3,000. A vote being taken on said amendment it was declared lost and the original motion of Mr. Niblack was carried.

Mr. Jasper W. Lagrange, the newly elected Treasurer, presented his bond to the Board for approval.

Mr. Charles Downing, the newly elected Secretary, also presented his bond to the Board for approval.

On motion of Mr. W. W. Stevens the President was authorized to examine into and approve the bonds of the Treasurer and Secretary.

On motion the Board went into executive session for the purpose of electing a member of the Board to fill the vacancy caused by the resignation of Mr. Downing.

The names of Calvin Studevant, of Noblesville; Sid Conger, of Flatrock; William L. Risk, of New Castle, and Adam F. May of Flatrock, were placed in nomination as candidates for member of the Board for the Eighth District.

The President appointed Mr. McDonald and Mr. Howland tellers. The Board then proceeded to ballot on the names presented, which resulted as follows:

First ballot.—Mr. Risk received two votes; Mr. Conger, six votes; Mr. Studevant, four votes, and Mr. May, two votes.

No person having received a majority of all the votes cast, the President ordered another ballot, which resulted as follows:

Second ballot.—Mr. May received three votes; Mr. Risk, one vote; Mr. Conger, nine votes, and Mr. Studevant, one vote.

Mr. Niblack moved that the election of Mr. Conger be made unanimous, which motion was seconded by Mr. McDonald and was carried.

On motion of Mr. Niblack, duly seconded, a committee was appointed to wait upon Mr. Conger and notify him of his election, which was done, and Mr. Conger took his place as a member of the Board.

On motion of Mr. W. W. Stevens, duly seconded, the Board went into the election of a General Superintendent, which resulted as follows:

Mr. H. B. Howland received eleven votes; Mr. H. L. Nowlin, three votes, and Mr. Robison, one vote.

On motion of Mr. Nowlin, seconded by Mr. Robison, the election of Mr. H. B. Howland was made unanimous.

On motion of Mr. McDonald the Board proceeded to the election of a janitor for the ensuing year, which resulted as follows:

Mr. D. M. Brown received two votes; Mr. W. H. Stearn, nine votes, and Mr. H. C. Green, four votes.

Mr. Stearn having received a majority of all the votes cast was declared duly elected.

On motion of Mr. Stevens, seconded by Mr. Howland, the President and Secretary were instructed to enter into a contract for the Board with Mr. W. H. Stearn for the ensuing year.

On motion of Mr. Niblack, duly seconded, the matter of fixing the salaries for the officers for the ensuing year was referred to a committee appointed by the President as follows: Messrs. Niblack, Howland and Stevens, with instructions to report at the afternoon session.

Mr. Kiser, representing the Young People's Combined Christian Associations of Indianapolis, appeared before the Board and asked for the privilege of the Fair Grounds for the Fourth of July, 1900, and on motion of Mr. Howland the matter was referred to the Executive Committee, which was given power to act.

Mr. Weaver, of Shelbyville, asked the Board to correct a mistake in the premium list of 1899, and for an order for money awarded him as a premium on crab apples.

On motion the matter was taken under advisement awaiting the advice of Mr. Kennedy, the former Secretary.

Mr. Clark presented a proposition to take care of the race track, which was, on motion of Mr. Nowlin, referred to the Executive Committee.

A communication from William I. Buchanan was read, and on motion of Mr. McDonald the Secretary was instructed to acknowledge the receipt of the same.

On motion of Mr. Stevens, seconded by Mr. Nowlin, a committee of five was appointed to draw up a memorial to the Legislature requesting the purchase of the eighty (80) acres of land now under lease by the Board, for the use of the Indiana State Board of Agriculture, as follows: Messrs. Jones, Stevens, McDonald, Conger and the Secretary.

On motion of Mr. McDonald, seconded by Mr. Howland, the Board granted Mr. Brown, the janitor, the privilege of remaining in the house on the grounds until March 15, 1900.

The Committee on Salaries reported as follows:

Members, five dollars per day and five cents per mile for each mile traveled.

Secretary, eighteen hundred dollars per annum, he to pay help needed to conduct the work of his office.

Treasurer, five hundred and fifty dollars, he to pay ticket sellers and other help of his office.

General Superintendent, five dollars per day and six cents per mile for each mile traveled. Judges, five dollars per day and actual mileage.

W. W. STEVENS,
W. T. BEAUCHAMP,
E. A. ROBISON,
J. L. THOMPSON,
Committee.

On motion the report of the Committee on Salaries was concurred in by the Board.

On motion of Mr. Niblack, duly seconded, the Board resolved itself into a committee of the whole for the purpose of revising the premium list.

On motion Mr. Haines was selected as chairman of the committee of the whole.

The committee, after deliberation, authorized the Chairman to report the revision of the premium list for the year 1900, and on motion of Mr. Thompson the committee arose.

Mr. Haines, chairman of the committee of the whole, presented the report of the committee on the revision of the premium list, which report was concurred in, and the Secretary was ordered to have printed for distribution the premium list as revised and reported.

On motion of Mr. McDonald the President appointed a committee, composed of Mr. McDonald, Mr. Jones and the Secretary, to visit the offices of the secretaries of the Ohio and Illinois State Board of Agriculture, for the purpose of inquiring into the office system and manner of conducting their fairs and exhibitions.

The suggestions of Dr. A. W. Bitting, of Purdue University, were read to the Board, and on motion were referred to the Executive Committee.

On motion the Board adjourned until 9 o'clock to-morrow morning.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MEETING OF THE STATE BOARD OF AGRICULTURE, FEBRUARY 1.

The Indiana State Board of Agriculture met pursuant to adjournment.

All members were present except Mr. Levering.

On motion the minutes of yesterday's meeting were passed until the meeting of the Executive Committee.

On motion of Mr. Howland, duly seconded, the matter of arranging the show ring for harness horses was referred to the Executive Committee.

On motion of Mr. Barnett, duly seconded, it was ordered that in printing the premium list that the dairy-products class be made to follow the classification of dairy breeds of cattle.

At this point the President announced the names of the Superintendents of the different departments of the fair, as follows:

EXECUTIVE COMMITTEE.

Messrs. Stevens, Beauchamp, Robison and Thompson.

DEPARTMENT SUPERINTENDENTS.

Admissions	E. A. Robison.
Grand Stand	Jas. E. McDonald.
Speed	W. T. Beauchamp.
Horses	Mortimer Levering.
Beef Cattle	Marc S. Claypool.
Dairy Cattle and Dairy Products	Cott Barnett.
Swine	Mason J. Niblack.
Sheep	John L. Thompson.
Poultry	Sid Conger.
Art	John L. Davis.
Horticulture and Table Luxuries	Knode Porter.
Agricultural	John C. Haines.
Mechanical	W. W. Stevens.
Privileges	H. L. Nowlin.

On motion of Mr. Howland the standard for judging corn presented by the committee from the Corn Grower's Association was adopted as the standard for judging corn at the coming fair, and was ordered to be published in the premium list.

On motion the Board adjourned.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MINUTES OF MEETING OF THE EXECUTIVE COMMITTEE, FEBRUARY 1.

At a meeting of the Executive Committee of the Indiana State Board of Agriculture, held at the Secretary's office, there were present: Hon. Aaron Jones, President, and Messrs. Stevens, Robinson, Thompson and Beauchamp, and H. B. Howland, General Superintendent, and Charles Downing, Secretary.

On motion Mr. Stevens was selected as chairman of the committee to make a special report on the hog.

Mr. B. A. Richardson appeared before the Board and asked that the insurance expiring during the coming year on the buildings on the Fair Grounds be placed with the companies represented by him.

After discussion, upon motion duly seconded, the Secretary was instructed to report to the Executive Committee at its next meeting the condition of the insurance on the buildings on the Fair Grounds.

On motion it was ordered that in the absence of the Executive Committee all bills against the Board be referred to the President for examination and allowance.

On motion of Mr. Beauchamp, duly seconded, the matter of purchasing stationery for the use of the Board was referred to the Secretary with power to act.

On motion, duly seconded, the Secretary was instructed to draw a warrant in favor of W. W. Duncan, and one in favor of H. H. Boudinot.

On motion the committee adjourned to meet at the call of the President.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MEETING OF THE EXECUTIVE COMMITTEE, MAY 1.

Minutes of the meeting of the Executive Committee of the Indiana State Board of Agriculture, held at the office of the Secretary, May 1, 1900:

The Executive Committee was called to order by Hon. Aaron Jones, President.

There were present Messrs. Robison, Thompson and Stevens.

Mr. Merrill Moores appeared before the committee in the interest of the railroad association and explained the character of an entertainment which the railroad people proposed to give on the 4th of July on the Fair Grounds. After which, upon motion, duly seconded, the Secretary was ordered to enter into a contract with the railroad association, allowing them to use all of the Fair Grounds on July 3d and 4th for a head-end collision, horse races, bicycle races, automobile races, and such other amusements as the association desires to give, not inconsistent with the laws of the State, with the following restrictions: That no intoxicating liquors, including hop ale; that no gambling of any kind, including pool selling, should be allowed on the grounds during said days, and that the association have the use of the grounds and pay \$200 for the same on or before the ground is broken or before any work preparatory to giving the entertainment. And that \$50 of said amount be returned to said association when the grounds, fences, etc., are placed in as good condition after the entertainment is over as they were before the work for preparing for said entertainment was begun.

On motion the President and Secretary were directed and empowered to look after and contract for all advertising matter connected with the fair.

On motion the Secretary was instructed to confer with Mr. Gibson and formulate a plan for carrying out the ideas presented by him to the Board to make an educational exhibit at the Indiana State Fair.

Dr. Blue, of Indianapolis, explained to the Board a scheme for sending music over the Fair Grounds during the fair by telephone, etc. And on motion Dr. Blue was given the privilege of putting telephones on the Fair Grounds during the fair and dispensing music over them to the patrons of the fair, with the understanding that the Board was to be at no expense whatever.

Mr. Mills, manager of the Indianapolis Military Band, explained to the Board a program for a night attraction during the fair and gave the Board prices for a musical program, as follows: Two nights, \$255; three nights, \$310.

Mr. M. H. Tuttle, of Evansville, submitted a design for a poster for advertising the fair, which was to be tinned top and bottom and to be 9x25 and to cost \$375 for 5,000.

On motion the woods pasture at the Fair Grounds was rented to Mr. Frank Johnson until the 1st day of November for \$112.50 on demand, Mr. Johnson to have privilege of herding his cattle in said pasture and not to suffer or allow them to pasture any other part of the grounds or to run at large thereon. And he is to remove them from the Fair Grounds at least one week before the week of the fair. Upon the violation of this contract on his part all rights are to be forfeited.

On motion the State militia was granted the privilege of holding an encampment for instruction on the Fair Grounds and to use the infield of the race track for drilling purposes, the State to pay \$50 for the same.

On motion of Mr. Stevens, duly seconded, the three-cornered piece of ground and the woods pasture connected therewith north of the bridge containing about ten acres, was rented to Mr. H. B. Howland for the year to end April 1, 1901, for \$25, to be paid on demand. And said Howland is to sow the ground not now in grass with grass seed, under the direction of the Board.

On motion the employment of music for the coming fair was referred to the President with power to act.

On motion Mr. H. B. Howland was employed to keep the race track in order during the coming season, and the Secretary was authorized to enter into a contract with him for the Board, and to stipulate in the contract that Mr. Howland is to keep the track in perfect order until after the fair; that he is to furnish all tools not owned by the State Board and to keep the track in order. The Board is to have the use of two teams for hauling manure, gravel, etc., when not engaged in track work. The Board is to pay as compensation the sum of \$100 per month, payable at the end of each month. And the work under the contract is to close at the end of the fair. And after the fair the teams so engaged are to be used in hauling the manure accumulated on the grounds on to the track, and this work is to continue up to October 1, 1900. All work under the direction of the President.

And it is also a part of Mr. Howland's duty to collect all stall rents and turn them over to the Treasurer, taking his receipt for the same.

On motion the German Kali Works of New York, were given permission to build an exhibition building on the east end of lot No. 19 adjoining the Studebaker building.

On motion all insurance policies expiring during the year were ordered to be renewed by Mr. B. A. Richardson, insurance agent of Indianapolis.

On motion all matters connected with the street railway and railroads in connection with the coming fair were referred to the President and Secretary, with power to act.

On motion of Mr. Thompson, seconded by Mr. Robison, Professors Bitting and Clark, of Purdue University, were allowed \$75 for work done by them in connection with the special report on the hog, and the Secretary was ordered to draw a warrant in their favor for that amount.

On motion of Mr. Stevens, duly seconded, the Secretary was instructed to draw warrants for the salary of the Superintendent and janitor on the first day of each month and forward the same to President Jones for his signature.

On motion the matter of formulation of rules for the issuing of tickets in the machinery department was referred to Mr. Stevens, with power to act.

On motion the speedway, or track, in front of the grand stand was ordered to be used for the exhibition of road and show horses.

On motion the Executive Committee adjourned to meet on the call of the President.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MEETING OF THE EXECUTIVE COMMITTEE, JULY 10.

The Executive Committee met at the office of the Secretary July 10, 1900, pursuant to the call of the President.

There were present Hon. Aaron Jones, President, and Messrs. Stevens, Thompson, Robison and Beauchamp.

Judge E. B. Martindale addressed the Board on the subject of giving a corn show at the coming fair and recommended that the Board prepare the Studebaker building for that purpose.

On motion, Messrs. Stevens and Thompson were appointed a committee to confer with the officers of the Indiana Corn Growers' Association, and said committee was given power to consummate any arrangement agreed upon between the representatives and officers of said Corn Growers' Association and said Committee.

On motion, it was ordered that the committee would make a special order of the street railroad question at 10 o'clock to-morrow morning.

Mrs. M. A. Moody, Mrs. Ada B. Leck, a committee from the Woman's Christian Temperance Union of Indianapolis, addressed the committee on the subject of a building on the fair grounds which was to be devoted exclusively to women and the society which they represented.

Mrs. Leck requested the Board to assign her space in the Art Hall during the approaching fair for the purpose of distributing the literature of the W. C. T. U. Association and to allow said association the privilege of holding lectures in the second story of the said Art Hall.

On motion, the following bills were allowed:

Indianapolis Gas Company.....	\$174 60
Balke & Krauss.....	2 80

On motion, Marson & Miller were given the privilege of building a cement trough on the Fair Grounds, the location to be fixed by the General Superintendent, provided same is built in a good workmanlike manner and at no expense to the Board.

Mr. Mitchell appeared before the Board in the interest of the Wheelman's League and asked that, in granting a franchise to the traction company of a right of way for the proposed interurban line, the bicycle path be protected.

Mr. Charles L. Henry, of Anderson, representing the Union Traction Company, explained to the Board what the traction company desired from the Board in the matter of a right of way for its proposed line near the Fair Grounds.

On motion, the Secretary was directed to notify Mr. Haines, Superintendent of the agricultural department, that the entire east end of the Agricultural Hall had been assigned to the Corn Show by the committee. And it was also ordered that the General Superintendent erect a large tent in front of the Agricultural Building for the agricultural implements offered as special premiums in the Corn Show.

Mr. Stevens offered the following resolution, which was duly seconded by Mr. Thompson, and on motion was adopted by the Board.

Be it resolved, That the President and Secretary of this association be and are hereby authorized and directed for and on the part of and in the name of this association to convey to the Union Traction Company of Indiana the right of way for railroad purposes over a strip of land thirty (30) feet wide along and off of the south side of the lands and Fair Grounds of this association, and the east side thereof from the southeast corner as far north as the main entrance on the east side of said grounds: *Provided*, That such right of way at the southeast corner shall be with a curve of two hundred (200) feet radius; such conveyance to be made by accurate description. After such right of way is surveyed, provided that in the event any other interurban street railroad company shall desire to come into the city of Indianapolis over the same route, it shall have the right to run its cars over such line on such reasonable terms as may be agreed upon between such companies; or, in case of a failure on their part to agree, then it shall be settled by arbitration.

Provided, Said conveyance shall be void after six months from the date thereof, unless the road of said company shall be built and in operation over the right of way granted by such conveyance.

The representative of the Indianapolis Tent and Awning Company explained his scheme for furnishing tents for the tented city.

On motion of Mr. Stevens, seconded by Mr. Thompson, the Indianapolis Tent and Awning Company was granted the privilege of furnishing tents for persons who desire to camp on the Fair Grounds, on the same terms and conditions as was furnished by said company last year.

Mr. Holmes, a representative of the Canadian Government, requested a space for an exhibit by his government, and on motion of Mr. Thompson, Mr. Holmes was given space in the Horticultural Building for his exhibit, said space to be designated by the Superintendent of said building.

On motion, the sum of \$50 was appropriated to decorate the Art Building, to be done under the direction of Mr. Davis, Su-

perintendent of said building. And the Secretary was directed to notify Mr. Davis of the action of the committee.

The committee then arose to meet at 9 o'clock to-morrow morning.

MEETING OF THE EXECUTIVE COMMITTEE, JULY 11.

The committee met pursuant to adjournment, with all the members present.

On motion it was ordered by the Board that the President and Secretary have charge of advertising the fair.

On motion of Mr. Thompson, seconded by Mr. Robison, the matter of the Patchen-Gentry race was referred to Mr. Beauchamp with power to act, and to contract for the same for a sum not less than \$2,300.

On motion, it was ordered that vaudeville attractions be given between the heats of the races during the fair, and the President and Secretary were authorized to contract for the same.

On motion, Mr. Beauchamp was authorized to give races for the members of the Indianapolis Driving Club, and that he advise with the President and Secretary in making up such races.

On motion of Mr. Stevens, the President and Secretary were authorized to formulate rules and regulations governing the issuing of complimentary tickets for the coming fair.

On motion, it was ordered that the city police be engaged for the fair.

On motion Mr. H. L. Nowlin was allowed to advertise the State Fair in his circuit to the extent of \$20.

On motion the Secretary was instructed to notify musical organizations bidding to furnish music for the fair to include the board of the musicians in their bids.

Mr. Lovett, representing the Central Traction Company, appeared before the Board and requested a grant for the right of way for an interurban railroad over the land owned by the Board on the east and south sides of the Fair Grounds.

Messrs. Houser and Nepper, of the Young Men's Christian Association requested the Board to assign them a space for a tent 40x60 for a retreat, etc., which was granted.

On motion of Mr. Beauchamp, seconded by Mr. Thompson, the President was authorized to purchase one hundred settees for the Fair Grounds.

On motion the President was authorized to employ a press agent to write up the features for the coming fair for the local newspapers.

On motion the application for space by Mr. Vorhis for an exhibit at the fair was referred to H. L. Nowlin, Superintendent of Privileges.

By consent of the Board the matter of arranging for special train service on the Monon railroad from the city to the grounds during the fair was referred to the President and Secretary, with power to act.

On motion the committee adjourned to meet on the call of the President.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MEETING OF THE STATE BOARD OF AGRICULTURE, SEPTEMBER 17.

The Indiana State Board of Agriculture met at the Administration Building on the Fair Grounds on Monday morning, September 17, 1900, for the purpose of conducting the Indiana State Fair for 1900 as per program adopted by the Board.

There were present Messrs. Jones, Robison, Stevens, Claypool, Barnett, McDonald, Davis, Niblack, Beauchamp, Nowlin, Conger and Howland, members of the Board; Charles Downing, Secretary, and J. W. Lagrange, Treasurer.

On motion of Mr. Claypool, seconded by Mr. McDonald, it was ordered by the Board that the complimentary tickets issued by the officers of the Board be honored in the grand stand.

Mr. McDonald, Superintendent of the grand stand, made a verbal report on the construction of the boxes in the grand stand, which was approved by the Board.

On motion the price of the boxes in the grand stand was fixed at 25 cents in addition to the admission fee to the grand stand, and the printing of the tickets for the boxes was referred to Mr. McDonald, Superintendent of the grand stand.

On motion it was ordered by the Board that the members of the Board be admitted to the grounds during the fair on their badges; that the city police in full uniform, and that the city firemen in full uniform be admitted to the grounds without tickets.

On motion it was ordered that the Board meet each morning during the fair at 8:30 a. m.

On motion, duly seconded, it was ordered that the exhibition of live stock in front of the grand stand be discontinued at 12 o'clock noon, sharp, each day of the fair.

On motion of Mr. Claypool, seconded by Mr. Niblack, it was ordered that the Secretary issue to all successful exhibitors a statement of the premiums awarded them, and that the Treasurer pay the amount of premiums due exhibitors on said statements.

On motion the Secretary was ordered to draw a warrant on the Treasurer in favor of the St. Joseph County Savings Bank for

\$502.60, the amount advanced said Board as a loan, with the interest thereon.

On motion the Board adjourned until 8:30 o'clock to-morrow morning.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MEETING OF STATE BOARD OF AGRICULTURE, SEPTEMBER 18.

The Indiana State Board of Agriculture met pursuant to adjournment at the Administration Building on the Fair Grounds.

President Jones called the meeting to order.

The roll of the members was called and there were present Messrs. Jones, Levering, Davis, Thompson, Stevens, Robison, Conger, Haines and Claypool.

On motion of Mr. Conger, Mrs. Stevens was authorized to take charge of the exhibit of Mrs. W. S. Day, and to make awards on same of ribbons only.

On motion of Mr. Thompson the Board adjourned until 8:30 to-morrow morning.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MEETING OF STATE BOARD OF AGRICULTURE, SEPTEMBER 19.

The Indiana State Board of Agriculture met pursuant to adjournment.

There were present all the members of the Board except Mr. Levering.

There being no business to come before the Board an adjournment was ordered until 8:30 o'clock to-morrow morning.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MEETING OF STATE BOARD OF AGRICULTURE, SEPTEMBER 20.

The Indiana State Board of Agriculture met pursuant to adjournment in the Administration Building on the Fair Grounds at 8:30 o'clock.

There were present Messrs. Jones, Nowlin, Thompson, Robison, McDonald, Claypool, Davis, Porter and Haines.

It was announced that Hon. Hiram B. Howland, a member of the Board and General Superintendent, had died on Wednesday night.

Thereupon, on motion of Mr. Claypool, a committee was appointed to draft resolutions upon the death of Mr. Howland, as follows: Messrs. Claypool, McDonald and Thompson.

On motion of Mr. Davis the Board voted to attend the funeral in a body.

On motion of Mr. Claypool it was ordered that the fair close on Friday evening.

On motion of Mr. Porter, it was ordered that the flag on the Administration Building be placed at half mast in honor of Hon. H. B. Howland.

On motion of Mr. Claypool Mr. McDonald was appointed a committee of one to procure a funeral design for the funeral of Mr. Howland, and also to procure carriages for the members of the Board to attend the funeral of Mr. Howland, at the expense of the Board.

On motion of Mr. McDonald, which was duly seconded, the following resolution was unanimously adopted:

RESOLUTION.

WHEREAS, The balance now on hands in the treasury and the receipts of the fair are insufficient to pay all the premiums, expenses of the fair, improvements made during the present year, insurance and other incidental and necessary expenses of the Board up to and including January, 1901; and,

WHEREAS, It is absolutely necessary to borrow money to meet these liabilities; therefore, be it

Resolved, That the President and Secretary of the Indiana State Board of Agriculture be and are hereby authorized and empowered to negotiate for a sum of money sufficient to cover the indebtedness above enumerated, on the best terms possible, and that they execute a note or certificate of indebtedness or mortgage therefor in the name of and for the Indiana State Board of Agriculture, and said officers are also hereby authorized to do whatever else that may be necessary and proper in the premises to consummate said loan for the purpose above mentioned.

J. E. McDONALD.

On motion all bills for expenses, advertising, etc., against the fair were ordered to be presented to the Executive Committee for allowance, which would meet upon the call of the President.

On motion of Mr. McDonald, Mr. E. H. Peed, of New Castle, Ind., was appointed to act as General Superintendent to fill the vacancy of Mr. Howland, until the January meeting in 1901.

On motion the Board adjourned.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MEETING OF STATE BOARD OF AGRICULTURE, SEPTEMBER 20.

A meeting of the Indiana State Board of Agriculture was held in the Administration Building, on the Fair Grounds, at 4 o'clock p. m., upon the call of the President.

The meeting was called to order by the President, Hon. Aaron Jones. There were present the following members: Messrs. Mc-

Donald, Beauchamp, Robison, Stevens, Nowlin, Porter, Conger, Davis, Haines, Thompson and Niblack.

By consent of all the members present the President fixed a meeting of the Board for Saturday afternoon at the Grand Hotel, immediately after the funeral of Mr. Howland.

On motion the Board adjourned.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MEETING OF STATE BOARD OF AGRICULTURE, SEPTEMBER 21.

The Indiana State Board of Agriculture met in the Administration Building, on the Fair Grounds, on September 21, 1900.

There were present Messrs. Jones, Claypool, Stevens, Porter, Haines, Robison, Davis, Conger, Thompson, Beauchamp and Nowlin.

Mr. Stevens moved that Mr. Cotton be dismissed from the service of the Board on account of his having been active in causing the arrest of several persons who had paid for privileges for giving shows on the Fair Grounds. The motion was duly seconded.

Thereupon Mr. Thompson moved to amend said motion by allowing Mr. Cotton to make a satisfactory apology to the Board, and, by his returning the money collected in fines and costs to the parties whom he had caused to be arrested, or to use his best efforts to cause the same to be returned.

After a discussion and after hearing the statement of Mr. Cotton, a vote was taken upon the amendment offered by Mr. Thompson, which was declared lost.

The original motion was thereupon put and declared carried, and Mr. Cotton was ordered to be dismissed from the service of the Board.

The Board then adjourned.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MEETING OF STATE BOARD OF AGRICULTURE, SEPTEMBER 21.

The Indiana State Board of Agriculture met in the Administration Building, on the Fair Grounds, on September 21, 1900.

There were present Messrs. Jones, Claypool, Stevens, Porter, Haines, Robison, Davis, Conger, Thompson, Beauchamp and Nowlin.

On motion of Mr. McDonald the application of Mr. Sherry for the return of the amount paid by him for a license to the county treasurer for showing on the Fair Grounds was dismissed and no action taken thereon.

On motion of Mr. Conger the Secretary was authorized to make an effort to collect the amount paid for a show license by Mr. Sherry from Marion County and return the same to Mr. Sherry.

On motion it was ordered that no exhibits be removed from the Fair Grounds until 4 p. m.

On motion it was ordered that Wednesday's race program be carried out to-day, and that the Superintendent of speed be authorized and directed to declare all races off which are not started at 4 o'clock p. m.

On motion the Board adjourned.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MEETING OF STATE BOARD OF AGRICULTURE, SEPTEMBER 22.

The Indiana State Board of Agriculture met on September 22, 1900, at the Grand Hotel, in room No. 3, and was called to order by the President, Mr. Jones.

The roll was called and all members responded except Mr. Levering.

The committee on resolutions on the death of Mr. Howland reported the following, which was unanimously adopted, ordered to be spread upon the record of the Board and a copy thereof sent to the family:

REPORT.

Hiram B. Howland died at his home near Indianapolis, September 19, 1900, in the full meridian of life.

Mr. Howland was an honored member of the Board for nearly eight years, and served as its General Superintendent for two years. During his connection with the Board, Mr. Howland demonstrated his ability as a fair manager in every department in which he was called upon to fill. And such was his reputation that his services were sought by many of the agricultural associations throughout the State to judge live stock and as a starter of races.

In his work he was especially strong, and it was a rare thing for his decisions to be questioned.

Although Mr. Howland was educated for the profession of the law, his mind and inclinations ran to agriculture, and he abandoned the law for the farm. That he was a successful farmer his farms attest.

He was often heard to remark that he was delighted with farm life and its environments.

His home, as many members of the Board know, was an ideal farmers' home, where his friends were ever welcome.

Resolved, That in the death of Mr. Howland the Indiana State Board of Agriculture has lost an honored and valued member; his associates a warm-hearted and candid friend; the community a respected neighbor and citizen, and his family a loving, faithful, generous and devoted husband and father.

Resolved, That this Board tender to the family of Mr. Howland its sympathy in this hour of their bereavement, and that these resolutions be spread upon the record of the Board, and a copy thereof be delivered to the family.

Respectfully submitted,

M. S. CLAYPOOL,
J. E. McDONALD,
JOHN L. THOMPSON,
Committee.

On motion the matter of covering the race track on the Fair Grounds was referred to Mr. Beauchamp, Superintendent of the Speed Department.

Mr. Niblack moved that the matter of filling the vacancy caused by the death of Mr. Howland be postponed until the January meeting.

Which motion was lost.

On motion of Mr. Niblack, duly seconded, the President was instructed to cast the entire vote of all members present for Mr. E. J. Robison, of Indianapolis, to fill the vacancy on the Board caused by the death of Mr. Howland.

On motion of Mr. Claypool it was ordered that the President instruct the janitor to remove the chairs from the grand stand and place them under the grand stand.

On motion of Mr. Conger, Mr. Peed, the Acting General Superintendent, was allowed \$3 per day for his services up to the present time.

On motion of Mr. McDonald the Executive Committee was authorized and empowered to adjust any difference between the Board and Mr. Peed, Acting Superintendent, as to the salary of the Acting Superintendent.

On motion of Mr. McDonald all unfinished business of the Board was referred to the Executive Committee.

On motion the Board adjourned.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

MEETING OF EXECUTIVE COMMITTEE, OCTOBER 10.

The Executive Committee met pursuant to the call of the President at the Secretary's office.

The meeting was called to order by Mr. Jones, President.

All members of the committee were present.

On motion bills numbered from — to — were considered and allowed.

On motion the committee took a recess until to-morrow morning.

MEETING OF EXECUTIVE COMMITTEE, OCTOBER 11.

The Executive Committee of the Indiana State Board of Agriculture reconvened.

All the members answered to the roll call.

On motion of Mr. Robison all bills of bill posters for placing hangers were allowed at the rate of one cent a sheet, and for placing one-sheets, four cents a sheet.

On motion the Secretary was authorized to draw warrants in favor of the Treasurer for the premium statements redeemed by him, as follows: One warrant for \$3,600, and the other for \$8,732.75, making a total of \$12,332.75.

On motion Mrs. M. H. Tuttle was allowed \$42 for her services for taking charge of the entry books in the Woman's Department.

And it was ordered that hereafter the custom of separating the two departments be discontinued.

On motion it was ordered that the bill of Wm. B. Burford, amounting to \$275, be allowed, and that the balance of said bill be continued until the January meeting of the Board.

On motion the bill of the Indianapolis Bill Posting Co. was continued until the January meeting.

On motion of Mr. Stevens it was ordered that the stables on the Fair Ground be closed for the winter season, and that all persons now occupying stables be ordered to vacate the same at once.

On motion the matter of the charge for holding the Jersey cattle sale on the Fair Grounds was referred to the Secretary and the janitor for adjustment.

On motion all arrangements for the annual meeting to be held in January were left to the President and Secretary.

On motion the Executive Committee adjourned to meet on the call of the President.

AARON JONES,
President.

CHARLES DOWNING,
Secretary.

ANNUAL MEETING OF THE INDIANA STATE BOARD OF AGRICULTURE.

As provided by law, the Indiana State Board of Agriculture convened in room 12, Capitol Building, at 10 o'clock a. m., January 8, 1901, Hon. Aaron Jones, President of said Board, presiding, and all of the Board present.

Hon. Thomas Taggart, Mayor of Indianapolis, was introduced and delivered the following address of welcome:

Mr. President, Officers and Members, Friends of the Indiana Agricultural Association:

I desire on behalf of the citizens of Indianapolis to extend to the members and their friends a hearty and cordial welcome to the city. I also wish to congratulate the association upon the success of its last annual meeting. The State Board is an organization or an institution in which every citizen of Indiana should be interested, and in which every citizen should take a just pride. It is a matter in which we are all interested, for this Board devotes a great deal of its time in providing opportunities for Indianians to exhibit to the people what they have produced. While Indianapolis is the capital city, we feel that the citizens of Indianapolis should give to the State association every help and assistance in their power to make their work a success. While it is due from the entire State that assistance should be given, I feel that the people here owe more to the State Board than any other city in the State. I really think the citizens of Indianapolis should cooperate directly with this Board in getting special features which the city of Indianapolis would be responsible for from a financial point of view. The State Fair brings business to the city, it brings thousands and thousands of people here who spend their money. By cooperating with the State Board of Agriculture I believe a great deal might be done by the city in increasing attendance at the fair. I believe something might be done with the co-operation of the Merchants' Association of this city and the State Board.

This, I believe, is the only suggestion I have to make. Of course you know the President of this organization carries the keys of the city of Indianapolis, so if any of you should get lost President Jones will see that you get home safely if you call on him. I thank you for the pleasure of addressing you.

The Vice-President, Hon. John C. Haines, was called to preside.

President Jones read his address, but before reading, said:

Before beginning my address I desire to say to the suggestion made by the honorable Mayor of Indianapolis, as to the city furnishing certain of the entertainments, that it meets with my hearty approval. I am pleased to see that the city is realizing the vast benefits accruing to it from the people who come here from all parts of the State. I was interested in a meeting held in Ohio a few days ago, at which the entire Board of the State was present. They had a subscription list from the city of Columbus of \$10,000, which they would guarantee along the lines spoken of by Mayor Taggart, to guarantee the association from loss. I do not like to see the city of Indianapolis behind the city of Columbus, and I would even like to see them go Columbus one better.

PRESIDENT'S ADDRESS.

To the Members of the State and Delegate Board of Agriculture:

The State Fair of Indiana in 1900 was in all respects a good fair. In every department the entries were large and the exhibits of superior merit, representing the best productions of the artist, the skilled mechanic, the factory, the farm and home. These exhibits were alike creditable and an honor to the exhibitors, the fair and the State. The management sought to make the fair worthy of the State, and worthy of the patronage of the best and most refined citizens of the State, and to keep the Fair Grounds and the grounds adjacent free from all objectionable influences. In short, the management sought to make this fair of such a character as would appeal to the best element of society—a fair where the most refined and Christian lady could take her children and enjoy a day in viewing the wonderful progress displayed on every hand from factory, farm, orchard, garden and home, and at the same time have a social visit with friends, and not be annoyed by seeing or hearing on or near the grounds anything that would offend refined tastes, or in any way injure or debase innocent childhood.

I believe that fairs are and should be for the best elements of society. I am pleased to be able to congratulate the management and the State for the success of the fair in this regard. We believe it was largely owing to this determination and effort to keep the fair free from all objectionable features that elicited so hearty and full cooperation of the people of the State. Fairs, as we understand them, their objects and purposes, are to educate the people and keep them advised through object lessons and otherwise of the progress and advancement in the science of agriculture, horticulture, floriculture, stock breeding, and in mechanic arts, labor and time saving inventions that contribute so much to the general welfare. It is on this ground of education that legislatures and county commissioners are justified in making appropriations to the maintenance and aid

of fairs. Where properly conducted and managed, fairs educate the people along lines very useful and important to the welfare of the people of the State. Whatever contributes to a more perfect knowledge of the laws governing vegetable and animal growth and development, and in the use of labor-saving devices, that economizes time and labor in the management of factory, farm and home adds to the prosperity, wealth and happiness of the people, and is a part, and an important part, of the educational system of the State.

The State Board of Agriculture should be at the head and direct all measures that relate exclusively to the agricultural development of the State. It should gather and tabulate all statistical information relating to agriculture. From the office of the State Board of Agriculture during the planting, growing and harvesting season, daily, weekly and monthly bulletins of the conditions affecting the planting, growing and harvesting of the crops, and such other information as will keep farmers advised of the general conditions affecting markets, should be issued. Such bulletins issued by the State Boards of Agriculture of Indiana and other States and from the Department of Agriculture at Washington would be worth millions of dollars each year to the agricultural toilers of our country, and add immensely to the wealth of the nation.

The State Board of Agriculture should be in close touch and cooperate with the national Department of Agriculture, and should be a part of the great system of agricultural organization. The State Board of Agriculture should be charged with the duty of aiding in establishing and maintaining county agricultural and horticultural associations in every county in the State, and in many of the counties these societies should be extended to township organizations, each working independently, yet all co-operating together in contributing to the success of all. A general system of fairs should be held under the auspices of these associations. In the smaller fairs held by township associations, the residents of the township would compete with each other in skill and production. In county fairs the entire county would compete, and in State the entire State and nation. Thus a perfect system would be established of competition and emulation. In all of these fairs strict rules should be adopted shutting out and excluding what is known as professional exhibitors that follow attending fairs as a profession. They serve no useful purpose whatever, but discourage legitimate competition and thereby injure fairs, and to some extent at least work against the best interest of agricultural fair associations. I desire to say the State Fair, and in fact all fairs, should make special effort to please, interest and benefit the common people. This class of citizens should feel that the fairs are for them, to help the common farmer, the fruit grower and vegetable gardener, the mechanic, and in fact all people engaged in the ordinary walks of life, and not exclusively for any class or classes. That fair will prosper best and do the most good that will get nearest the people and make special effort to benefit them. Such fairs

will be largely attended and will be of far greater benefit to manufacturers and breeders for the more extended advertising advantages afforded. I favor introducing into all fairs public and private sales conducted under proper and guarded rules. Such public and private sales will attract interest, benefit and accommodate manufacturers, breeders and farmers, and the people generally.

The State Board of Agriculture should be in close touch with the State agricultural college and aid it in popularizing agricultural education and assist the college in securing bright boys and girls to attend the agricultural course at Purdue. The farmers of the State need and need badly a thorough knowledge of the best methods of conserving fertility of the farms of the State. To the close observer it is clear that one-half of the shrinkage of land values is to be attributed to the loss of fertility of the soil. This loss in the aggregate amounts to many millions of dollars. And this depletion of intrinsic value will continue until better methods are learned and applied. And we must look to our agricultural college for great aid in this direction. The farmers' institutes are another method of education and dissemination of better methods in agricultural pursuits, and the most friendly and cordial cooperation should be maintained between all agricultural and horticultural societies and farmers' institutes. It might not be out of place for me at this time to say I believe these farmers' institutes have been well and successfully managed by Purdue, and that Indiana can claim as good a superintendent of institutes, Prof. W. C. Latta, as can be found in any of the States.

Farmers' clubs and granges could also be utilized as a means of educating farmers to better and more scientific methods.

The agricultural press and the press generally has at all times offered its columns for the dissemination of any and all information that will add to the production of larger and more profitable returns.

Through these various agencies the State Board of Agriculture could and should reach and benefit greatly every citizen of the State. Through county, township, agricultural and horticultural societies every home in the State could be reached and benefited. Country homes and their surroundings would be made more tasty, attractive, comfortable and pleasing. These homes could be so arranged and surrounded by beautiful grounds, ornamented with trees, shrubs and flowers. Country roads made better, free rural mail delivery extended to all parts of the State, telephone connection with neighbors and village and city. These features introduced into farm life will make homes in country more desirable, and this will add to the values of country real estate, and this will increase the assessed value of the State. This alone would justify the Legislature in extending and broadening the powers and duties of the State Board of Agriculture.

I believe all this and more was contemplated when the Legislature in 1852 incorporated the Indiana State Board of Agriculture. Section 2787

provides: "There shall be held in the city of Indianapolis, on the first Tuesday after the first Monday in January, annually, a meeting of the Indiana State Board of Agriculture, together with the presidents of each county agricultural society or other delegate therefrom duly authorized, who shall for the time being be ex-officio members of the State Board of Agriculture for the purpose of deliberating and consulting as to the wants and conditions of the agricultural interests of the State."

Section 2788 says: "It shall be the duty of said Board to make a report to the General Assembly of the receipts and expenditures of the Board, together with such proceedings of the State Board and reports from county agricultural societies as well as a general view of the condition of agriculture throughout the State, accompanied with such recommendations as they may deem interesting and useful."

This language of the statutes seems to imply that the Legislature looks to this body and to this meeting to make certain recommendations as the wisdom of this body may deem proper as the basis for legislation for the better development of the agricultural resources of the State.

It would seem to me eminently proper for this body to say to the General Assembly what legislation, if any, we desire to invest this Board with the powers and duties to make it of greater usefulness and benefit to the agricultural interests of the State.

I believe the powers and duties of this Board should extend far beyond the mere holding of annual fairs, however important this may be, and we regard it very important. The framers of the statute contemplated the State to be organized to facilitate the development of the agricultural resources of the State. Where can this duty and authority be more properly vested than in the State Board of Agriculture. I therefore respectfully suggest and recommend that the General Assembly, by appropriate legislation, invest the State Board of Agriculture with authority and direct it to gather and tabulate all statistical information relative to agriculture, and to disseminate this information to the citizens of the State in such manners as this Board shall direct, that the greatest benefit may come to the citizens of the State. I also recommend that the General Assembly, by appropriate legislation, make it incumbent on this Board, so far as possible, to aid, strengthen and encourage the formation of county and township agricultural and horticultural associations in every county of the State.

I also recommend and urge the General Assembly to purchase, and have the title rest directly in the State, that portion of the State Fair Grounds now held by lease with privilege to purchase.

I also recommend that the General Assembly provide by appropriate legislation for introducing and make mandatory the study of the elementary principles of agriculture (nature studies). This should be included in the educational system of the State, and will in time lead to the highest development of the agricultural resources of the State, stop the ruinous

depletion of the fertility of soils, and raise the standard of agricultural pursuits from one of manual labor to one of intellectual investigation, adding not only profit to agricultural pursuits, but adding greatly to the values of all property in the State.

The sudden death of a valued and esteemed member of this Board, Mr. Hiram Howland, who passed to his reward on Wednesday, during the fair, cast a gloom over his coworkers, and all exhibitors and visitors at the State Fair. His family and relatives have the heartfelt sympathy of all his coworkers on the State Board and elsewhere.

CONCLUSION.

I desire to return to all officers and members of the Board, to exhibitors and patrons of the fair, to the citizens of the State generally, to the entire press of the State for their valuable aid and courtesy, and to the citizens of Indianapolis and the entire press of the city of Indianapolis, I desire to thank one and all and express my acknowledgments for their valuable aid and assistance. We desire to say to all the people of the State and to the people of Indianapolis, stand together, let's co-operate in making all more prosperous. We all feel proud of our grand and beautiful capital city, and we hope in return that your citizens will cordially continue in the future as in the past, to do what you can to add prosperity to the country and that you will rejoice with us in the grand possibilities of agricultural development that lie before us. We have a great State, none better in the Union in all the elements that constitute a great State. Our resources are vast in mines, in stone, in manufacturing, in commerce, in agriculture, and in the enterprise, virtues and intelligence of her people. Let us all stand together for their highest development.

AARON JONES,

President Indiana State Board of Agriculture.

On motion, duly seconded, the President's address was referred to the following committee: Archibald Stinson, W. W. Stevens and John L. Davis.

The President then announced the following committees:

Committee on Credentials—John Tilson, Robert Mitchell and W. T. Beauchamp.

Auditing Committee—W. W. Stevens, E. A. Robison.

Committee to wait on Governor Mount and escort him to the room—H. F. McMahan, J. L. Dungan and W. M. Blackstock.

The committee performed its duty and Governor Mount was introduced and addressed the meeting as follows:

GOVERNOR MOUNT'S ADDRESS.

Gentlemen of the State Board of Agriculture:

It is somewhat refreshing to step aside from the perplexing responsibilities of official duties and look into the faces of the "horny-handed sons of toil." Perhaps I ought to modify this statement by saying, those who represent these sons of rural life. You may not, some of you, be of them, but you come from them as their representatives. You may not in life have been regaled by the rich aroma of blooming clover, or the sweet fragrance of tasseling and silking corn; but the fact remains that you are the representatives of agriculture, and as such I beg to address you for a few moments.

You have been very generous in your cordial invitation to me to address your honorable body, and likewise liberal in not trammeling me with any theme. It is sometimes as difficult to choose a subject as to discuss a topic. You will pardon me if, for a few moments, I discuss your relation to agriculture. The statute creating you a body corporate indicates your relationship to this great industry in the following pertinent language, to wit:

"For the purpose of deliberating and consulting as to the wants, prospects and conditions of the agricultural interests throughout the State."

The above is, in part, the work of this Board as defined by the law. In view of the fact that agriculture is the paramount industry in the State, occupying the attention and energy of one-half of our people, and in view of the still more important fact as relates to this Board, you are the only organization in the State entrusted by law with the high duty and responsibility of looking after "the wants and conditions of agricultural interests."

The aggregation of statistics is sometimes misleading unless carefully studied. The aggregate of manufactured products in the United States exceeds in value the products of the farms, but this does not argue that they create more wealth. The hundreds of millions of bales of cotton and pounds of wool, the hundreds of millions of bushels of grain, and the millions of live stock, as well as the products of the dairy, the poultry yard, the orchard, the vineyard, the fruit and vegetable garden, are products *created* by the husbandman. The products of the packing houses, the mills, the factories, represent but the finishing of the products of the farm, and they become the debtor to the farm for a large per cent. of the value of these products when finished. The agricultural exports, amounting last year to \$850,000,000, tell of the magnitude and the importance of this great industry you represent.

SOME OF THE NEEDS.

I desire, briefly, to refer to some of the channels through which you can promote agriculture. The exhibition of fine samples of products from the orchard and the farm gives to the farmer ideals, and reveals possibilities that may be attained by all. Marvelous improvements in flocks and herds, which rewards not only the grower but adds to the material prosperity and wealth of the State, are, in part, the fruitage of agricultural fairs.

GOOD ROADS.

This will always be a vital question. It will remain so as long as there are people who travel over highways. The condition of the roads is a fair index to the thrift, progress and intelligence of the people who use them. Isolation is the greatest discouragement to rural life. Mud roads intensify this barrier. Friction of mind sharpens intellect. Contact with the daily transactions of the world gives a practical education. The country needs this and must have it. Your influence can greatly aid this needed improvement. Rural delivery of mail has been and is still proving one of the greatest benefactions to the farmer. He must have the daily papers, and this is impossible without free delivery of mail, which, in turn, is impossible without good roads.

MIGRATION TO THE TOWNS AND CITIES.

One of the alarming conditions of the day is the removal of the well-to-do farmers from their country homes to the towns and cities. This causes the home in the country to be occupied by the renter, and soon the dingy appearance of the unpainted buildings and neglected lawns makes the country environment uninviting and unattractive. These farmers, many of them, have but little to occupy their energies in the towns, and are incapable of rendering the good service to the State that they might render if they remained in the country putting forth their energies in beautifying their homes and making the farm both attractive and productive. The boys and girls of the country note the neglect, and lack of beauty and attraction, and are led to the conclusion that these environments belong to country life, and hence a distaste for the country. The absence of social advantages and opportunities for intellectual growth, the lack of books, papers and magazines, deprives the young people of the rural districts of the very environments that would add a charm to country life. The interest of the country demands better homes and better advantages to the young people if the talent thereof is to be kept in this noble vocation. The growing of improved breeds of live stock is

important, better crops are needed, but above these transcending in importance is the development of a higher standard of citizenship in the country. I am well aware that so far as freedom from schemes to defraud, and for pure life and plain honesty of purpose, the country excels the city; but to these surroundings that teach industry, economy and temperance let us seek to add the charm of wisdom and the grace of cultured manners. I trust that to these needed things some of your thoughts and discussions will be directed.

POSSIBILITIES ON THE FARM.

The pessimistic, nonprogressive farmer is a positive hindrance to enterprising husbandry. He sees no grand possibilities in farm life and hence puts forth but little effort to win success. Such a farmer fails and discourages the young man from entering this vocation. To the young men on the farm and to those desiring to become farmers I beg to say that no vocation offers grander opportunities to the man of intelligence and industry than that of the farm; safer, by far, for pluck and push, for perseverance and investigation, are the chances of the farm than the alluring fascinations of speculation or the deceptive hopes of political reward. Independence is a condition to manliness. He who looks to the public for his support is shorn of the noblest attribute of citizenship and becomes a slave. To create wealth is laudable. To be a self-constituted pensioner on the public is discreditable.

THE INFLUENCE OF THIS BODY.

Since the middle of the eighteenth century agricultural societies have existed in France, and during these one hundred and fifty years have been a potent factor in advancing farm interests. The national society of agriculture in France was organized in 1761. Agricultural societies in Austria were formed as early as 1765. Agricultural societies now exist in all the European countries. They are fostered by the governments and are composed, as they should be, of intelligent, successful farmers. In all legislation pertaining to the farm and live stock interests they are consulted, and become a dominant power in advancing these interests. I trust, gentlemen, with keen perception and quickened energy, you will seek the promotion of agriculture in this State. The holding of a successful State Fair is worthy of your energies, and should engage your zeal and wisdom. You are deserving of and should receive the cooperation of all the people of the State. Home pride in our State Fair should encourage large patronage. Not this Board, but the State reaps the benefit. Your duties and usefulness are not circumscribed by fair limitations, but are broader and more significant. Your sphere of usefulness is as broad as the noble vocation you represent.

THE CHARM OF RURAL LIFE.

What scene more inviting than that presented on the farm where flocks and herds are quietly feeding in luxuriant pastures, or the picture of ripening harvest and growing corn? What more satisfying than to see the orchard planted by one's own hand fragrant with bloom, or the boughs bending with ripening fruit? Through these blooming orchards and growing crops, through the recurring of seedtime and harvest, the husbandman is in unison with nature, and his soul is lifted to trustful communion with nature's God. I shall joyfully lay aside the honors, the emoluments, the responsibilities of public life for the sweets and quiet of my country home.

SECRETARY'S REPORT.

The Secretary's report of receipts and expenditures was read and is as follows:

Indianapolis, Ind., January 5, 1901.

To the President and Members of the Indiana State Board of Agriculture:

Gentlemen—I herewith submit my annual report of the receipts and disbursements of said Board for the year ending January 5, 1901, to wit:

Receipts.

Balance on hand.....	\$801 90
Appropriations	10,000 00
Rent of grounds	637 50
Rent of track and stalls.....	112 00
Privileges	4,023 50
Stall fees	919 00
Entry fees	1,320 00
Exhibitor's tickets	483 00
Special admissions	569 00
Admissions	19,796 75
Corn	250 00
Special premiums	1,135 00
Loan, Franklin National Bank.....	2,977 90
Loan, St. Joseph Bank.....	500 00
Miscellaneous	17 50
Total	\$43,543 05

Disbursements.

Per diem and mileage.....	\$2,800 48
Salaries	2,289 13
Construction	359 00
Repairs	2,040 43
Furniture and tools.....	115 33
Insurance and rental.....	3,987 52
Banking and interest.....	4,502 60
Postage, telegraph and telephone.....	630 70
Express and freight.....	142 85
Printing, stationery and supplies.....	1,131 71
Advertising.....	3,200 81
Judges	845 00
Police	470 50
Assistant superintendents	1,423 22
Supplies for fair.....	2,472 09
Claims for past year.....	54 60
Music	315 00
Lecture	100 00
Miscellaneous	508 53
Premiums	16,125 75
Warrants for 1899 paid by Treasurer in 1900.....	51 10
Balance on hand.....	86 10
Total	\$43,543 05

STATEMENT OF FAIR.

Receipts.

Privileges	\$4,023 50
Stall fees	919 00
Entry fees	1,320 00
Exhibitor's tickets	483 00
Special admissions	560 00
Admissions	10,769 75
Deficit	4,767 51
Total	\$31,851 76

Disbursements.

Speed	\$3,800 00
Horses	1,800 00
Cattle	2,550 00
Sheep	1,778 00
Swine	1,321 00
Poultry	572 50
Fruits	530 50
Flowers	445 00
Bees and honey.....	96 00
Dairy products	102 50
Agricultural	733 50
Art	1,162 50
Table luxuries	160 25
Per diem and mileage.....	2,000 40
Salaries	2,280 13
Postage, telegraph and telephone.....	630 70
Printing, stationery and supplies.....	1,131 71
Advertising	3,200 81
Judges	845 00
Police	470 50
Assistant superintendents	1,423 22
Supplies for fair.....	2,472 09
Music	315 00
Lecture	100 00
Press agent	50 00
Railroad guaranty	119 85
Total	\$31,851 76

SUMMARY.

Total receipts for 1900.....	\$43,543 05
Total disbursements	43,456 95

Balance on hand in treasury..... \$86 10

I herewith attach a detailed statement of all orders drawn on the Treasurer to the date of this report.

Very respectfully submitted,

CHARLES DOWNING,
Secretary.

The following orders have been issued by the Secretary since the last annual meeting upon the order of the Board:

	Warrant		
1900.	No.	To Whom Issued.	Amount.
Jan.	3.—5726.....	W. T. Beauchamp.....	\$22 30
"	3.—5727.....	John L. Davis.....	24 40
"	3.—5728.....	Knode Porter	26 00
"	3.—5729.....	Mason J. Niblack.....	36 70
"	3.—5730.....	John C. Haines.....	47 00
"	3.—5731.....	W. W. Stevens.....	39 30
"	3.—5732.....	E. A. Robison.....	21 50
"	3.—5733.....	H. L. Nowlin.....	29 00
"	3.—5734.....	H. B. Howland.....	20 00
"	3.—5735.....	Charles Downing	22 00
"	3.—5736.....	M. S. Claypool.....	25 40
"	3.—5737.....	Mortimer Levering	26 40
"	3.—5738.....	John L. Thompson	27 00
"	3.—5739.....	Cott Barnett	27 80
"	3.—5740.....	James E. McDonald	41 50
"	3.—5741.....	Banner Pub. Co.....	12 00
"	3.—5742.....	Charles F. Kennedy.....	17 60
"	3.—5743.....	Aaron Jones	40 60
Feb.	1.—5744.....	American Express Company.....	1 94
"	1.—5745.....	American Trotting Association.....	45 86
"	1.—5746.....	Adams Express Company.....	3 06
"	1.—5747.....	American Association	25 00
"	1.—5748.....	Beltz & Fiske.....	75
"	1.—5749.....	Foster Lumber Co.....	6 66
"	1.—5750.....	Hogan Transfer Co.....	7 00
"	1.—5751.....	Indiana Paper Co.....	1 20
"	1.—5752.....	Journal Printing Co.....	17 00
"	1.—5753.....	Indiana Paint and Color Co.....	3 00
"	1.—5754.....	Monarch Supply Co.....	5 45
"	1.—5755.....	New Telephone Co.....	20 90
"	1.—5756.....	New York Store	371 18
"	1.—5757.....	Pool Bros.....	320 00
"	1.—5758.....	B. A. Richardson.....	286 79
"	1.—5759.....	Sentinel Printing Co.....	1 80
"	1.—5760.....	United States Express Co.....	2 56
"	1.—5761.....	Robert Zener Co.....	646 91
"	1.—5762.....	Western Union Telegraph Co.....	77
"	1.—5763.....	Chas. F. Kennedy.....	25 00
"	1.—5764.....	Chas. F. Kennedy.....	75 00
"	1.—5765.....	D. M. Brown	15 00

	<i>Warrant</i>		
1900.	No.	To Whom Issued.	Amount.
Feb.	1.—5766.	D. M. Brown	\$16 00
"	1.—5767.	John C. Haines	42 00
"	1.—5768.	Mason J. Niblack	31 70
"	1.—5769.	W. W. Stevens	34 30
"	1.—5770.	E. A. Robison	16 50
"	1.—5771.	H. L. Nowlin	24 00
"	1.—5772.	Knode Porter	11 00
"	1.—5773.	H. B. Howland	10 00
"	1.—5774.	W. T. Beauchamp	27 30
"	1.—5775.	John L. Davis	24 40
"	1.—5776.	M. S. Claypool	15 40
"	1.—5777.	John L. Thompson	32 00
"	1.—5778.	Cott Barnett	22 80
"	1.—5779.	Jas. E. McDonald	36 50
"	1.—5780.	Aaron Jones	40 60
"	1.—5781.	Sid Conger	16 30
"	1.—5782.	H. B. Howland	15 25
"	1.—5783.	Crawfordsville Journal	2 00
"	1.—5784.	Middletown News	1 00
"	1.—5785.	Mary J. Burke	15 00
"	1.—5786.	Bridgeport Nurseries	10 50
"	1.—5787.	Western Union Telegraph Co.	95
"	1.—5788.	Geo. R. Browning	1 00
"	1.—5789.	Charles Downing	10 65
"	1.—5790.	Knight & Jillson	11 16
"	1.—5791.	Wm. B. Burford	95
"	1.—5792.	American Express Co.	3 25
"	1.—5793.	Adams Express Co.	9 82
"	1.—5794.	Logansport Pharos	2 00
Mar.	10.—5795.	D. M. Brown	15 00
"	10.—5796.	D. M. Brown	13 00
"	10.—5797.	E. A. Robison	13 00
"	10.—5798.	Charles Downing	150 00
"	10.—5799.	Central Union Telephone Co.	7 55
"	23.—5800.	Sentinel Printing Co.	4 75
"	23.—5801.	Deering Harvester Co.	4 50
"	23.—5802.	Journal Printing Co.	16 00
"	23.—5803.	Balke & Krauss	21 25
"	23.—5804.	R. L. Polk & Co.	5 00
"	23.—5805.	New Telephone Co.	1 45
"	23.—5806.	The Fred Deitz Co.	26 25
"	23.—5807.	American Express Co.	8 44
"	23.—5808.	United States Express Co.	64 36
"	23.—5809.	Adams Express Co.	17 51

Warrant		To Whom Issued.	Amount.
1900.	No.		
Mar.	23.—5810.....	Wm B. Burford.....	\$21 70
"	23.—5811.....	McElwaine-Richards Co.....	4 44
"	23.—5812.....	Joe A. Downey.....	2 00
"	23.—5813.....	The Bowen-Merrill Co.....	90
"	23.—5814.....	H. B. Howland.....	20 55
"	23.—5815.....	Charles Downing.....	150 00
"	23.—5816.....	Aaron Jones.....	41 70
"	23.—5817.....	Charles Downing.....	10 00
"	24.—5818.....	W. H. Stern.....	28 00
Apr.	5.—5819.....	Theressa H. Smith.....	2,412 00
"	5.—5820.....	Cashier First National Bank.....	4,000 00
"	5.—5821.....	Phelps Publishing Co.....	1 00
"	5.—5822.....	Charles Downing.....	1 70
"	5.—5823.....	American Express Co.....	10 48
"	5.—5824.....	Adams Express Co.....	3 94
"	5.—5825.....	W. E. Wallace.....	2 00
"	5.—5826.....	W. H. Stern.....	31 00
"	5.—5827.....	Aaron Jones.....	25 60
"	5.—5828.....	Charles Downing.....	5 00
"	5.—5829.....	J. W. Lagrange.....	137 50
"	5.—5830.....	Banner Publishing Co.....	162 30
"	5.—5831.....	John Stretch.....	15 75
"	5.—5832.....	Charles Downing.....	150 00
"	19.—5833.....	Adams Express Co.....	14
May	2.—5834.....	American Express Co.....	3 16
"	2.—5835.....	Charles Krauss.....	31 50
"	2.—5836.....	Wm. Rouse & Son.....	21 94
"	2.—5837.....	W. A. King.....	1 00
"	2.—5838.....	T. F. Carmony.....	1 50
"	2.—5839.....	New Telephone Co.....	25
"	2.—5840.....	Indiana Paint and Color Co.....	4 75
"	2.—5841.....	Albert Hutchinson.....	5 91
"	2.—5842.....	United States Express Co.....	1 90
"	2.—5843.....	J. E. McDonald.....	59 95
"	2.—5844.....	Charles Downing.....	30 50
"	2.—5845.....	W. H. Stern.....	30 00
"	2.—5846.....	W. W. Stevens.....	63 60
"	2.—5847.....	Aaron Jones.....	83 93
"	2.—5848.....	E. A. Robison.....	11 50
"	2.—5849.....	John L. Thompson.....	17 00
"	2.—5850.....	A. W. Bitting.....	75 00
"	2.—5851.....	H. B. Howland.....	105 00
"	2.—5852.....	Charles Downing.....	25 00
"	15.—5853.....	McElwaine-Richards Co.....	9 50

Warrant		To Whom Issued.	Amount.
1900.	No.		
May	15.-5854.	Charles Krauss.....	\$11 40
"	15.-5855.	Wm. Mitchell Printing Co.....	34 25
"	15.-5856.	Charles Downing.....	150 00
"	22.-5857.	New Telephone Co.....	20 00
"	22.-5858.	Geo. H. Madden.....	30 00
June	1.-5859.	W. H. Stern.....	31 00
"	1.-5860.	H. B. Howland.....	100 00
"	1.-5861.	J. M. Patterson.....	2 00
"	1.-5862.	S. S. Boots.....	2 50
"	1.-5863.	Balke & Krauss Co.....	2 80
"	1.-5864.	United States Express Co.....	90
"	1.-5865.	American Express Co.....	85
"	1.-5866.	American Trotting Association.....	75 00
"	1.-5867.	Indianapolis Gas Co.....	174 60
"	15.-5868.	Hogan Transfer Co.....	21 85
"	15.-5869.	Charles Downing.....	150 00
July	2.-5870.	H. B. Howland.....	100 00
June	30.-5871.	Geo Smith.....	4 00
"	30.-5872.	W. H. Stern.....	30 00
"	30.-5873.	Benton Bailey.....	22 50
July	11.-5874.	W. T. Beauchamp.....	40 00
"	11.-5875.	W. W. Stevens.....	34 20
"	11.-5876.	E. A. Robison.....	11 50
"	11.-5877.	John L. Thompson.....	22 00
"	11.-5878.	H. B. Howland.....	68 50
"	11.-5879.	Dean Bros.....	1 60
"	11.-5880.	Indiana Paint and Color Co.....	1 50
"	12.-5881.	Deering Harvester Co.....	4 00
"	12.-5882.	Frank E. Janes.....	1 12
"	12.-5883.	Charles Krauss.....	48 10
"	12.-5884.	Indianapolis Journal.....	1 00
"	12.-5885.	New Telephone Co.....	20 00
"	12.-5886.	United States Express Co.....	1 97
"	12.-5887.	Hogan Transfer Co.....	2 39
"	12.-5888.	Wm. B. Burford.....	353 28
"	12.-5889.	Gray Lithograph Co.....	457 54
"	12.-5890.	Koener & Hayes.....	490 00
"	12.-5891.	T. F. Carmony.....	2 50
"	12.-5892.	American Express Co.....	75
"	12.-5893.	Charles Krauss.....	23 35
"	12.-5894.	The Bowen-Merrill Co.....	5 00
"	12.-5895.	The Billboard.....	1 00
"	12.-5896.	H. T. Conde Implement Co.....	70
"	12.-5897.	Aaron Jones.....	40 60

Warrant		To Whom Issued.	Amount.
1900.	No.		
July 12.	5898.	Charles Downing	\$54 26
"	12.—5899.	Charles Downing	50 00
"	12.—5900.	Charles Downing	150 00
"	21.—5901.	Aaron Jones	25 60
"	24.—5902.	Treasurer Railroad Association	50 00
Aug. 1.	5903.	Hiram Howland	100 00
"	1.—5904.	W. H. Stern	31 00
"	18.—5905.	Charles Downing	150 00
"	23.—5906.	H. B. Howland	168 24
"	28.—5907.	Homer Bragg	15 00
"	28.—5908.	Ira Stevens	15 00
Sept. 1.	5909.	H. B. Howland	78 25
"	1.—5910.	H. A. Bragg	15 00
"	10.—5911.	H. B. Howland	143 00
"	10.—5912.	Perry Klingensmith	50 00
"	10.—5913.	H. B. Howland	100 00
"	10.—5914.	W. H. Stern	31 00
"	10.—5915.	H. B. Howland	181 60
"	19.—5916.	St. Joseph County Savings Bank	502 60
"	19.—5917.	Othle Way	15 00
"	19.—5918.	Mason J. Niblack	77 00
"	21.—5919.	M. S. Claypool	134 95
"	21.—5920.	Mortimer Levering	119 50
"	21.—5921.	Knode Porter	162 80
"	21.—5922.	Mrs. Sarah B. Rorer	100 00
"	21.—5923.	John C. Haines	73 55
"	21.—5924.	H. L. Nowlin	169 10
"	21.—5925.	John L. Davis	324 40
"	21.—5926.	Mason J. Niblack	64 50
"	21.—5927.	John L. Thompson	167 00
"	21.—5928.	John L. Thompson	75 00
"	21.—5929.	H. L. Nowlin	119 00
"	21.—5930.	J. E. McDonald	180 50
"	21.—5931.	Ligonier Banner	48 00
"	21.—5932.	J. E. McDonald	81 50
"	21.—5933.	M. S. Claypool	66 65
"	21.—5934.	Sid Conger	30 00
"	21.—5935.	J. W. Lagrange	275 00
"	21.—5936.	Sid Conger	79 50
"	21.—5937.	Knode Porter	61 00
"	22.—5938.	E. H. Peed	305 35
"	22.—5939.	Cott Barnett	81 50
"	22.—5940.	Cott Barnett	82 80
"	22.—5941.	John L. Davis	35 25

1900.	Warrant No.	To Whom Issued.	Amount.
Sept.	22.-5942.....	John C. Haines.....	\$86 10
"	22.-5943.....	W. W. Stevens.....	100 85
"	22.-5944.....	W. W. Stevens.....	28 35
"	22.-5945.....	Sid Conger	60 30
"	22.-5946.....	W. T. Beauchamp.....	180 95
"	22.-5947.....	W. T. Beauchamp.....	180 00
"	22.-5948.....	E. A. Robison.....	432 57
"	22.-5949.....	E. A. Robison.....	70 80
"	22.-5950.....	E. A. Robison.....	53 50
"	22.-5951.....	H. L. Nowlin.....	3 00
"	22.-5952.....	John L. Davis.....	80 40
"	22.-5953.....	Mrs. W. W. Stevens.....	30 60
"	22.-5954.....	Mason J. Niblack.....	66 70
"	22.-5955.....	E. H. Peed.....	63 35
Oct.	11.-5956.....	W. W. Stevens.....	24 30
"	11.-5957.....	E. A. Robison.....	11 50
"	11.-5958.....	John L. Thompson.....	22 00
"	11.-5959.....	W. T. Beauchamp.....	17 30
"	11.-5960.....	J. H. Peed.....	38 63
"	11.-5961.....	W. H. Stern.....	30 00
"	11.-5962.....	C. E. Marvin.....	208 90
"	11.-5963.....	Western Horseman	142 25
"	11.-5964.....	Indiana Farmer	62 50
"	11.-5965.....	Indianapolis Sentinel	100 00
"	11.-5966.....	Indianapolis Press	100 03
"	11.-5967.....	Indianapolis News	124 95
"	11.-5968.....	Independent	50 00
"	11.-5969.....	Guide Publishing Company.....	50 00
"	11.-5970.....	Horse Review	24 00
"	11.-5971.....	Chicago Horseman	106 91
"	11.-5972.....	Indiana Tribune	15 00
"	11.-5973.....	Gutenberg Company	25 00
"	11.-5974.....	The Sun	100 00
"	11.-5975.....	Breeders' Gazette	22 40
"	11.-5976.....	Inland Poultry Journal.....	10 00
"	11.-5977.....	Fair Publishing House.....	21 00
"	11.-5978.....	American Horse Breeder.....	70 00
"	11.-5979.....	American Grange Bulletin.....	33 60
"	11.-5980.....	William Mitchell Printing Company.....	72 55
"	11.-5981.....	American Sportsman Company.....	19 00
"	11.-5982.....	Poole Brothers	64 50
"	11.-5983.....	Jersey Bulletin	25 00
"	11.-5984.....	Bartlow & Mitchell.....	20 25
"	11.-5985.....	Swine Breeders' Journal.....	25 00

1900.		Warrant No.	To Whom Issued.	Amount
Oct.	11.	5986.	Indianapolis Journal	\$100 00
"	11.	5987.	Indianapolis Tent and Awning Company	200 00
"	11.	5988.	Indianapolis Paint and Color Company	59 55
"	11.	5989.	Dean Brothers	1 25
"	11.	5990.	Healy & O'Brien	82 02
"	11.	5991.	Indianapolis Gas Company	109 80
"	11.	5992.	John C. Pressly	7 25
"	11.	5993.	F. E. Janes	4 86
"	11.	5994.	Western Union Telegraph Company	12 96
"	11.	5995.	Geo. J. Mayer	5 95
"	11.	5996.	John Adams	3 75
"	11.	5997.	F. M. Rottler	2 95
"	11.	5998.	L. McPhetridge	50 00
"	11.	5999.	Canceled	
"	11.	6000.	Canceled	
"	11.	4001.	Noblesville Ledger	2 00
"	11.	4002.	Winchester Democrat	2 00
"	11.	4003.	Greensburg New Era	2 00
"	11.	4004.	Muncie Times	4 00
"	11.	4005.	Danville Republican	1 50
"	11.	4006.	Greensburg Review	2 00
"	11.	4007.	Hagerstown Exponent	1 50
"	11.	4008.	Hagerstown Farmer	1 50
"	11.	4009.	Franklin Star	5 00
"	11.	4010.	Greenwood Era	5 00
"	11.	4011.	Columbus Star	2 00
"	11.	4012.	Kokomo Tribune	2 50
"	11.	4013.	Plainfield Progress	1 00
"	11.	4014.	Winchester Herald	2 00
"	11.	4015.	Lebanon Patriot	2 00
"	11.	4016.	North Vernon Republican	1 00
"	11.	4017.	Logansport Chronicle	3 00
"	11.	4018.	Brazil Miner	1 50
"	11.	4019.	Vincennes Commercial	3 00
"	11.	4020.	Crawfordsville News-Review	1 50
"	11.	4021.	Wabash Plain Dealer	4 00
"	11.	4022.	Bedford Mail	1 50
"	11.	4023.	Lafayette Home Journal	5 00
"	11.	4024.	Ben Strickland	1 50
"	11.	4025.	Shelbyville Republican	2 00
"	11.	4026.	Lafayette Journal	3 00
"	11.	4027.	Covington Friend	1 50
"	11.	4028.	Winchester Journal	2 00
"	11.	4029.	Greencastle Banner-Times	2 00

Warrant		To Whom Issued.	Amount.
1900.	No.		
Oct.	11.—4030.	Morristown Sun.....	\$1 00
"	11.—4031.	Sun-Telegram, Richmond.....	2 50
"	11.—4032.	Wm. C. Ball & Co.....	4 00
"	11.—4033.	Brookville Democrat.....	2 00
"	11.—4034.	Muncie Herald.....	3 00
"	11.—4035.	Peru Record.....	2 00
"	11.—4036.	Peru Sentinel.....	2 50
"	11.—4037.	New Castle Tribune.....	2 00
"	11.—4038.	New Castle Press.....	2 00
"	11.—4039.	New Castle Republican.....	2 00
"	11.—4040.	Kokomo Dispatch.....	2 50
"	11.—4041.	Attica Ledger.....	1 50
"	11.—4042.	Greensburg Standard.....	2 00
"	11.—4043.	Geo. M. Williams.....	4 50
"	11.—4044.	Herald Publishing Company.....	7 50
"	11.—4045.	Bloomfield News.....	1 50
"	11.—4046.	Indianapolis Freeman.....	5 00
"	11.—4047.	Gas City Journal.....	1 00
"	11.—4048.	Lafayette Commercial Gazette.....	3 00
"	11.—4049.	Spirit of the Times.....	5 00
"	11.—4050.	Brazl Democrat.....	1 00
"	11.—4051.	Frankfort American Standard.....	2 50
"	11.—4052.	Logansport Reporter.....	2 00
"	11.—4053.	Mooreville Guide.....	1 00
"	11.—4054.	Bloomington Star.....	1 50
"	11.—4055.	Knightstown Banner.....	1 50
"	11.—4056.	Peru Journal.....	2 00
"	11.—4057.	Zionsville Times.....	1 00
"	11.—4058.	Union City Eagle.....	2 00
"	11.—4059.	Muncie News.....	4 00
"	11.—4060.	Vincennes City Star.....	1 50
"	11.—4061.	Lafayette Courier.....	3 00
"	11.—4062.	Lebanon Reporter.....	2 00
"	11.—4063.	Creencastle Star-Press.....	2 00
"	11.—4064.	Clay City Democrat.....	1 00
"	11.—4065.	Whinery's Swine Advocate.....	25 00
"	11.—4066.	Moffett & Austil.....	2 00
"	11.—4067.	Bowen-Merrill Company.....	25
"	11.—4068.	McElwaine-Richards Company.....	61 72
"	11.—4069.	C. W. Meikel.....	7 50
"	11.—4070.	Watkins & Ruschaupt.....	6 00
"	11.—4071.	H. A. Bragg.....	35 40
"	11.—4072.	B. A. Richardson.....	641 82
"	11.—4073.	West Disinfecting Company.....	19 15

	<i>Warrant No.</i>	<i>To Whom Issued.</i>	<i>Amount.</i>
1900.			
Oct.	11.—4074.....	Indianapolis Plant and Flower Company...	\$25 00
"	11.—4075.....	American Steel and Wire Company.....	6 00
"	11.—4076.....	J. P. Good.....	20 14
"	11.—4077.....	When Band	315 00
"	11.—4078.....	Atlas Engine Works.....	8 80
"	11.—4079.....	Smith, Day & Co.....	20 40
"	11.—4080.....	Monon Railroad	119 85
"	11.—4081.....	Indiana Paper and Bag Company.....	5 04
"	11.—4082.....	Whitehead & Hoag.....	28 86
"	11.—4083.....	H. W. Miller.....	415 04
"	11.—4084.....	Hubbard & Pritchard.....	187 83
"	11.—4085.....	G. H. Shover.....	5 40
"	11.—4086.....	Conde Implement Company.....	1 25
"	11.—4087.....	Stanton Turner	2 00
"	11.—4088.....	B. F. McCready.....	11 58
"	11.—4089.....	Christian Off & Co.....	5 00
"	11.—4090.....	D. S. Morris.....	.50
"	11.—4091.....	Meridian Livery Stable.....	25 00
"	11.—4092.....	Berterman Floral Company.....	25 00
"	11.—4093.....	T. F. Carmony.....	2 75
"	11.—4094.....	Mrs. W. H. Tuttle.....	42 00
"	11.—4095.....	Balke & Krauss.....	292 00
"	11.—4096.....	Lilly & Stalnaker.....	114 58
"	11.—4097.....	Wm. Burford	275 53
"	11.—4098.....	Indiana Newspaper Union.....	58 00
"	11.—4099.....	Parkhurst Brothers	20 37
"	11.—4100.....	R. C. Light	25 00
"	11.—4101.....	Frank G. Renkle.....	5 25
"	11.—4102.....	D. M. Brown.....	75
"	11.—4103.....	Tribune Printing Company.....	108 45
"	11.—4104.....	Bloomington Telephone	1 50
"	11.—4105.....	Frankfort Crescent	2 00
"	11.—4106.....	John Williams	8 00
"	11.—4107.....	John Calvin	7 40
"	11.—4108.....	J. E. Bridges.....	7 90
"	11.—4109.....	John L. Davis.....	12 00
"	11.—4110.....	J. H. Halfaker.....	6 85
"	11.—4111.....	E. M. Johnson, Comptroller.....	401 50
"	11.—4112.....	E. H. Peed.....	28 65
"	11.—4113.....	Charles Downing.....	278 85
"	11.—4114.....	Charles Downing	300 00
"	11.—4115.....	Eberhardt & Co.....	2 50
"	11.—4116.....	New Telephone Company.....	20 00
"	11.—4117.....	Deering Harvester Company.....	6 58

<i>Warrant</i>		<i>To Whom Issued.</i>	<i>Amount.</i>
<i>1900.</i>	<i>No.</i>		
Oct.	11.—4118.....	Hogan Transfer Company.....	\$20 61
"	11.—4119.....	New York Store.....	288 00
"	11.—4120.....	Frank Hoffman	102 85
"	11.—4121.....	Adams Express Company.....	17 30
"	11.—4122.....	United States Express Company.....	18 08
"	11.—4123.....	American Express Company.....	8 70
"	11.—4124.....	Mortimer Levering	34 15
"	11.—4125.....	Clay City Reporter.....	1 00
"	11.—4126.....	Illustrated Indiana Weekly.....	25 00
"	11.—4127.....	J. W. Lagrange	3,600 00
"	11.—4128.....	J. W. Lagrange, canceled.....	
"	11.—4129.....	J. W. Lagrange.....	8,732 75
"	11.—4130.....	Aaron Jones	140 50
"	11.—4131.....	Omer Andree	2 00
"	11.—4132.....	Her Satter	4 40
"	11.—4133.....	B. F. Brown.....	9 40
"	11.—4134.....	Anderson Bill Posting Company.....	18 03
"	11.—4135.....	J. G. Sawyer & Son.....	13 50
"	11.—4136.....	Jas. N. Dishon.....	11 60
"	11.—4137.....	Jas. H. Carr & Son.....	10 80
"	11.—4138.....	Henry Albaugh & Son.....	9 95
"	11.—4139.....	Hite & Clark.....	2 75
"	11.—4140.....	Walter Doup	9 70
"	11.—4141.....	Alexander Bill Posting Company.....	7 20
"	11.—4142.....	James Borst	9 50
"	11.—4143.....	M. E. Tinder.....	3 60
"	11.—4144.....	T. F. Chafee & Son.....	6 00
"	11.—4145.....	J. M. Miller.....	2 70
"	11.—4146.....	H. E. Henderson.....	6 00
"	11.—4147.....	A. Goyert	3 00
"	11.—4148.....	Lafayette Bill Posting Company.....	13 60
"	11.—4149.....	Murray & Swisher.....	9 75
"	11.—4150.....	Fred Seltz & Son.....	4 20
"	11.—4151.....	Chas. W. Stutesman.....	7 70
"	11.—4152.....	Lebanon Bill Posting Company.....	5 80
"	11.—4153.....	E. L. Kinneman.....	5 00
"	11.—4154.....	I. W. Armstrong.....	2 60
"	11.—4155.....	Wild Opera House.....	3 00
"	11.—4156.....	Ira Stevens	16 45
"	11.—4157.....	J. D. Alexander.....	5 40
"	11.—4158.....	W. T. Freas.....	2 00
Total			\$39,612 85

The Treasurer's report was then read as follows:

Indianapolis, Ind., January 8, 1901.

To the President and Members of the Indiana State Board of Agriculture:

Gentlemen—I herewith submit the following as my annual report for the year ending December 31, 1900:

Balance on hand from 1899.....	\$801 90
Appropriations	10,000 00
Received from loans.....	3,477 90
Received from Charles Downing, Secretary.....	4,784 00
Received from H. L. Nowlin.....	4,013 50
Received from Aaron Jones for special tickets.....	569 00
Received from sale of tickets.....	19,796 75
<hr/>	
Total	\$43,543 05
On order from President and Secretary.....	\$43,320 05
Outstanding warrants	72 95
Balance on hand.....	150 05
<hr/>	
Total	\$43,543 05

Respectfully,

J. W. LAGRANGE,
Treasurer.

After the adjournment of the meeting the Indiana State Association of Fair Managers held its annual meeting, the proceedings of which are as follows:

INDIANA STATE ASSOCIATION OF FAIR MANAGERS.

The second annual meeting of the Indiana State Association of Fair Managers was called to order by the President, Hon. H. L. Nowlin, of Guilford, Tuesday afternoon at 2 o'clock, in the State House.

The President: We meet here this afternoon under rather unfavorable circumstances. In the first place, the officers of this Association thought that it was hardly probable or possible that we should have very much time to devote to this Association, and con-

sequently no regularly prepared program was laid down for the meeting. After it was too late to get a regular program we found that in making the program of the Association they had given us the entire afternoon. It was attempted then to get some parties to prepare papers, but it seems that this attempt failed, and consequently there is not any regularly prepared paper this afternoon. Now, on the program you will notice that it is suggested that the different fair circuits meet to arrange their circuits for the coming year. Possibly it would be better to defer this until after we get the discussion on any subject that may be presented of interest to those who are present. I have written just a few words, and possibly you can get something out of that for discussion, and if the Vice-President will take the chair for a moment, I will read them.

Vice-President: We will now hear the President's address.

The President: I hardly think it is worth the name of an address. It is just a few random notes I have taken down since coming here.

PRESIDENT'S ADDRESS.

To the President and Members of the Delegate State Board of Agriculture:
Gentlemen—As Superintendent of Privileges for the year 1900 I desire to make the following report:

The plan of collecting in advance, or as nearly so as practicable, has proven very satisfactory.

The question of passes is the worst one to deal with in this department, and I hardly know just how to obviate it.

From my experience, I would recommend that the following plan be considered: Issue no passes for privileges, but let each person pay entrance fees at the gates, the same as patrons of the fair. Then make a reduction in the prices of the privileges accordingly. Issue one badge, good to stay on the grounds, for each five dollars paid for the privilege and make no exceptions to either of these rules.

This would cut down the privilege money, but I believe would more than make it up in gate receipts.

The fairs of 1900 were usually successful ones. Some were failures from local causes and some from the effects of bad weather, but as a rule the officers of the 1900 fairs are to be congratulated on their success, and

the majority can point to a balance on the right side of the ledger. Nearly all fairs had exhibits above the average in most of their departments. The State Fair was ahead of all records in its exhibits.

For the past three years my interest has been centered in the privilege department, and I have watched carefully the plans pursued by various organizations. Exclusive privileges are almost always unsatisfactory and a great annoyance.

I hope each of you will be free to ask questions, express opinions and make this meeting one of value to all of us.

Our Secretary has a report of what has been done in the past year, and questions are suggested there that will give opportunity for much profitable discussion.

The President having read the paper and resumed the chair, said: "I want you to discuss any question that you see fit. The Secretary has a report which we will be pleased to hear and after that we want you to discuss any subject that may come before you."

SECRETARY'S REPORT.

To the Members of the Indiana Association of the Fair Managers:

The first annual meeting of the Indiana Association of Fair Managers was held one year ago, January 2, 1900, in the Indiana State House. H. L. Nowlin, of Guilford, presided. On motion, which was adopted, all representatives of Indiana fairs who were present were invited to participate in the meeting.

Hon. Robert Mitchell, of Princeton, presented a paper which was read, entitled, "How to Run a Fair; Success Depends Upon Efficient Management." The subject of the paper was liberally discussed and generally approved.

The next paper was read by J. D. Williams, of Vincennes, upon "Our Duty as Citizens of Indiana to the State Board of Agriculture." A spirited discussion followed, in which the bad and the good features of former State and county fairs were freely condemned or approved, as the merits of the case seemed to demand.

This was followed by a paper on the "Neglected Things by Managers of Fairs," by Hon. Charles Downing, of Greenfield. The neglected things enumerated by Mr. Downing were commented upon and his suggestions were highly recommended.

These valuable papers, together with the discussions thereupon, are published in the Indiana Agricultural Report for last year.

A resolution was offered by Mr. Mitchell:

Resolved, That the State Association of Fair Managers favor giving to the State Board of Agriculture the exclusive right to the week selected

by the Board for the State Fair; and that said Board, at the earliest time possible, name the week, so that fair associations may take action, and arrange their dates so as not to conflict with the week selected for the State Fair."

This resolution was unanimously adopted.

The question of uniform entry fees was discussed, but no definite action was taken thereon; also various methods of advertising were discussed, all of which are given in the published report by the State Board.

The following named officers were elected to serve for the ensuing year:

President—H. L. Nowlin, Guilford, Ind.

Vice-President—Joshua Strange, Arcana.

Secretary—W. M. Blackstock.

Program Committee—Robert Mitchell, W. M. Blackstock, E. A. Robinson, Stephen Dungan.

Having visited a large number of fairs last year, observation seems to show an upward tendency in the moral tone and general management of those institutions. The objectionable shows, so common a few years ago, are being ruled out, and it is worthy of credit to the management of our last State Fair that every doubtful thing of that kind was kept off the grounds.

For the financial conditions of the local fairs of Indiana, the annual reports made and filed by said associations with the Secretary of the State Board alone will show the relative standing of such associations to each other, and their progress or failure as compared with preceding years.

I suggest that this Association recommend that said annual statements be tabulated and published in the State Board annual reports.

I would also recommend that action be taken at this meeting for more uniformity in the matter of general rules, such as may be applicable to all our fairs. For instance, the usual speed condition requiring that "entries shall be paid before the starting of each race" should be changed to read: "Entry fees for each day's races must be paid by 12 o'clock, noon, preceding said races." The usual long delays in getting races started makes the change of this rule necessary. Yet, should any one association alone adopt this change, it might be embarrassed in enforcing it, while if a large number of meetings agree to it, there will be no interference by the horsemen, and races can be started promptly on time.

The question of weights in harness racing--weighing in and weighing out--should be waived in our published conditions of races. It is an incumbrance. Each fair circuit should adopt uniform rules, as far as practicable.

Better methods of advertising should be devised than formerly. The showy bill posters alone are not sufficient. Series of carefully written articles in the newspapers, setting forth the importance of agriculture and the

educational advantages of fairs are probably the best medium for advertising. By cooperating with the Secretary of the State Fair in this manner of advertising, all the fairs of Indiana might be mutually benefited.

Competition everywhere from street fairs makes it imperative that State and county fair managers shall make their future meetings interesting and worthy of popular patronage, for by this means only can permanent success be attained.

W. M. BLACKSTOCK,
Secretary.

The President: You have heard the report, what is your pleasure?

A motion was made for its adoption, and seconded.

The Secretary: Mr. President, I don't think a report of that kind should be adopted, because the matter in it is largely suggestive and the items referred to may not meet with the approbation of some of the experienced fair workers present, but merely approval of the report is all that I think is proper.

The motion for adoption was then changed to approval of the report, which was seconded.

The President: As the Secretary stated, the idea of the report was to get discussion on it, and it is now before you, if you wish to discuss it.

Mr. Insley: Mr. Chairman, some of the suggestions of the Secretary are so radically different from the ordinary uses of our fairs and race meetings that to adopt that as a report would just be simply taking up his report and preparing it for our use in the future. There are suggestions there that I think are wise, and I think he who has had charge of the speed departments of our fairs will see the necessity for radical changes. The idea of weighing in and weighing out at the end of each heat is ridiculous to me. It has always seemed ridiculous to me, yet it has been one of the rules of the American Trotting Association for years. I think that the Secretary's idea is all right. I think the idea, too, of exacting a part of the entry fee so long before the race is wrong. There is

not a superintendent of a speed department but knows the difficulty in filling his speed department. The superintendent begins to hustle along about the 1st of June, and works from that time to the fair.

Mr. Blackstock: In regard to Mr. Insley's statement, I am not sure that he got my idea exactly. Intead of waiting until the race is called and require the whole crowd to wait until the several horsemen come up and settle their entry fees, I think these should be settled before noon of the day of the race so that there should be no delay when the race is called; and if the entry fee is paid it will be the horseman's loss if the race starts without him. Now, every secretary will agree with me that there is an embarrassment on almost every day just for that reason, and it is only one or two dilatory horsemen who cause the delay—think it is smart to keep the crowd waiting. Good horsemen usually come up and pay their entrance fee in advance. I believe the rule should be that entries be paid in the forenoon of the day of the race. As I said in my report, if one fair adopts a rule of that kind, it will embarrass them to enforce it, because some horsemen will say, "I did not know the rule and I was not prepared for it;" but if a number of associations adopt such rules, the matter becomes easy—easy for the secretary to transact his business and the association gets the approval of the crowd.

Mr. President: I like the suggestion just read. I believe that it should be followed up in other directions. For instance, in all cases have a uniform time for closing entries. With us it has been the rule that we hold open our books until 9:30 of the first day of the fair, and it frequently occurs that men stand around waiting and finding out that certain classes are not filled up, a man will sometimes pay a dollar entrance fee and take ten dollars out of the association. As Mr. Blackstock says, there should be some definite time fixed before the starting of the race when they shall pay their entry fee. You never saw a race but what there was some fellow always holding back, and if each fair will adopt the rule to

pay the entry fee before 12 o'clock on the last day of the race, when the race is called each member will be ready on the track ready to go. The same rule ought to hold good with regard to other things, but it should be uniform with fairs all over the State, or a man will come here and say, "Why, they don't do that way in Rushville or in Shelbyville." The fact is, there is a lack of uniformity, and if this Association of Fair Managers could get down to business and have some uniform rule in regard to payment of entry fees and along the line of payment of privileges, I believe, sir, it would be a great big thing for the fairs in the State. I should be glad for some step to be taken in that direction.

Mr. President: While we are looking after the advantage of the fair association we must look to the good of the horsemen. Now, if you compel the horsemen to pay before the race, sometimes it might work a hardship. Frequently the horse is not in condition to go on the track. There is nothing so easy to get out of condition as a race horse, and to compel fees to be paid so long in advance, the horseman not knowing whether his horse is going to be in condition to race or not, is one reason why he may wait. While we are looking on one side, we must also look on the other. The horsemen themselves must have a little advantage.

Mr. Blackstock: Mr. Chairman, I don't like to say too much, but in reply to the gentleman who has just spoken. I wish to say that it is the custom to work horses in the forenoon, and the horsemen know by noon whether or not their horses are in condition.

The President: If there is nothing further, the motion is before you for the adoption of the report.

The question being put to vote the motion was carried and the report was adopted.

Mr. Mitchell: This afternoon, I understand, is to be devoted to fair management. Those gentlemen who are here—some of them—know something about the failures of their fairs. I would like for them to tell us something about what is the cause of their

failures. I think that would be an interesting discussion. "What was the cause of your failure?" I make that as a suggestion, and wish we could get some suggestions on the cause of failures of the fairs in the State.

Mr. President: If any one can give us the reasons why these fairs fail we would like to have them.

Mr. Insley: For fear we lose sight of the suggestions of the Secretary, I move that the Chair appoint a committee of five to draft a system of uniform rules in accordance with the suggestions of the Secretary for the adoption by the several fairs, and submit copies of their report to the managers of each organized fair circuit in Indiana and recommend that said rules be inserted in their fair catalogues.

The motion was properly seconded.

Mr. Mitchell: That committee might meet and formulate rules and agree to adopt, and then, if they did agree, how are you going to get them embodied in the rules for the coming season?

Mr. Blackstock: The motion made by Mr. Insley merely proposes this: That a committee shall meet and formulate rules which would be an improvement on those that now obtain, to be submitted not only to this body a year from now but also to the managers of fair circuits that shall hereafter be formed. Surely if we can make our system better we ought to do it. I think that is the practical way and it is merely a question of the appointment of the committee for that purpose.

Motion carried.

The President then appointed on that committee Messrs. Insley, Blackstock, Taylor, Claypool and Young.

Mr. Blackstock: Mr. President, there is a matter of advertising. Now, there is not a secretary here but knows that the fair depends largely on the way we advertise it—the way in which we reach the people and make the people believe we have got some

thing worthy of their attention and worthy of their attendance. We have exhausted most of our methods, and if there is any member present that can suggest any better way, I think this is the time now to bring it out. There was a suggestion made here a year ago by Mr. Jones, the President of the State Board. I have thought over it a great deal since and think there is a good deal in it. It was that the State Board inaugurate a system of newspaper advertising, something similar to the methods adopted by the political parties for reaching the people. The idea is something similar to the plate system that the State central committee gets up and sends out to all the newspapers in the State, so that the one idea can be published all over the State. Now, his suggestion was that the State Board set forth important items in regard to the management of fairs and the utility of them, and the importance of the great question of agriculture and educating the people to a better appreciation of fairs, and that they send out slips to the secretaries of the various fairs and that these secretaries have those slips sent to the local newspapers, and in that way reach the people through the newspapers. This matter was discussed by some members of the Board last year as to how far this matter is practical, but the State Board may adopt it and have talented gentlemen prepare these articles. Unless, however, we have the co-operation of the secretaries, the idea will be of no practical value. Now, I think that every secretary will see that the matter of this kind could be made helpful to him. It is not an easy task for a man who is not in the newspaper business to sit down and write an article, but a man who is accustomed to it can write them and furnish the slips. I believe there is a possibility of great good coming to our fairs by a method of advertising in that way. I merely throw out this as a suggestion that has come to me.

Mr. President: Mr. Mitchell here suggested a subject: "The cause of the failure of the county fair." If we could have that discussed and also hear from those who have had success it would be a good thing.

Mr. Mitchell: We have no failures in our county. Our fairs have been a success right straight along. The failures are what we want to find out about—we want to know the reason for every failure.

Mr. President: I would like to ask the gentleman why the fair in his county has been a success.

Mr. Mitchell: We have the support of our people. The people stand behind the fair and give it their support. We were \$1,500 ahead of expenses last year. We are in debt some, but will soon have it liquidated. We try to manage the fair to suit the people. We have rigidly excluded all forms of gambling and fake shows. We have no gambling of any kind. Now, the fairs that have gone down have done so because of laxness in the matter of shows. They let shows come in there that ought never to be on the grounds. The children go and look at them and talk about the shows to their parents, and the fairs soon run down in consequence. Another thing detrimental is in losing sight of the interests of exhibitors. Now, this thing of charging a per cent. to the exhibitors for making an exhibit is radically wrong. We ought to make them just as little expense as possible, for those are the ones that make our gate receipts for us.

Mr. President: I would like to ask the gentleman if he ever permitted those little games of chance.

Mr. Mitchell: Never did in the world, in the last forty-eight years. We fought them to the bitter end.

A Member: I would like to ask you what effect has professional exhibitors had upon the fairs.

Mr. Mitchell: In the county fair I think the professional exhibitor will really bar out the farmer with his stock, but at the State Fair it is different, and if you exclude the professional exhibitor you certainly exclude many first-class exhibits.

A Member: I want to inquire upon what terms you admit the exhibitor of agricultural implements.

Mr. Mitchell: We give them free room.

A Member: What about the sale of intoxicating liquors upon the fair grounds?

Mr. Mitchell: I will give you an incident that happened on our fair grounds. A man came in there with a nice merry-go-round, with boiler and engine, and it was really a great attraction for the children. What did that man do but set up a saloon. He was so bold in what he was going to do. Finally, some lady said to me, "There is something going on in that place. I saw two or three men coming out wiping their mouths." There we found in a part of their stand that they had five or six barrels of bottled beer. We fined them \$30. We do not allow the sale of intoxicating liquors on our grounds.

Mr. Insley: How did you collect the fine?

Mr. Mitchell: Very easily. We made him pay it. He couldn't get his goods until he did.

A Member: What right had you to keep his goods?

Mr. Mitchell: Why, we assumed control of it.

A Member: The Fair Association did not keep the fine, did they?

Mr. Mitchell: Yes, sir.

A Member: Wasn't this in violation of the law? The fine reverts to the State.

Mr. Mitchell: Well, we had more use for it than the State had.

Mr. Insley: Now, I have a question for you. We, at Crawfordsville have a pretty good fair over there, but we have this condition of affairs: It is the fair preceding the State Fair. We have Mr. Burgess, and we have a few more exhibitors like him, and we have a few extra herds of cattle come to us and then go on to the State

Fair. We have not any local man who can compete with those gentlemen. Shall we exclude those gentlemen. They have simply driven the farmers away from our fair.

Mr. Michell: I do not think a county fair can afford to have the professional exhibitors come to it, because it discourages local farmers, and local exhibitors won't go because they are not able to compete against the professionals.

A Member: What is meant by professional exhibitors?

Mr. Mitchell: The man who keeps a herd of fine cattle and makes it a business to exhibit them at any fair.

A Member: I would like to ask if the professional exhibitor in the art gallery, as well as in the stock department, does not also reduce the interest in the fair.

Mr. Mitchell: No, I think not. The art exhibit is an exceptional one. There are very few local artists. We have an amateur and a professional exhibit, so that they do not clash.

A Member: Well, I should like to say one thing. Now, in Johnson County we are not afraid of the world in corn and wheat, and in fact anything that grows out of the ground. But if we did not invite men to bring their herds of cattle and their flocks of sheep and horses, we would have a very poor showing. Now, perhaps there are one or two herds in Johnson County that make a pretty fair showing, but we believe we can not afford to rule out every one of those you call professional. We do not care how many men come to Johnson County with what they have to show.

A Member: Now, in Knox County it works this way: They have an award for stock from local exhibitors and they have a professional award, so that everybody gets a fair show.

A Member: Do you sell exclusive privileges?

Mr. Mitchell: No. That is one of the worst features. We sell no exclusive privileges. For instance, you take one of these

merry-go-rounds; two or three want to come in. If you give the exclusive right to one, you shut others out. So it is better to let them all in.

Mr. Blackstock: In regard to this professional exhibiting, the Lafayette Fair experimented a little on that, and for the last three years we have limited entries in the woman's department to Tipton and adjoining counties. The idea was to rule out those professional exhibitors in these lines who come there with store goods. Most of them are foreign; they come from Chicago, Louisville or St. Louis. We ruled them out in that way. We take it for granted that the ladies of Tipton County are interested in the exhibits, and they are entitled to that privilege alone. That does not make it so narrow but what we have a good and interesting exhibit in that line, and our exhibits have been better than ever before, because the local people have been encouraged, and it is worth their while to go to the trouble. Another thing, and it is in regard to that which I mentioned a while ago. Provided the State Board will employ persons who are qualified to prepare articles suitable for the promotion of fair interests, will you, as secretaries, see that they go to your local papers? Now, my experience is this: I have found the newspapers willing to get first-class printed matter, and I believe that if the State Board Secretary, or the committee, if either prepares papers of this kind and sends them out, it will do a great good. By doing this, that will be the same idea as this press matter of the politicians. In this way we can educate the people and stimulate their pride in those things. We want to know if the secretaries will co-operate with the State Board if it does this.

A Member: Mr. President, my experience with the newspapers, as Secretary of the Anderson Fair, is that they can not live on complimentaries. You have to pay for this business if the State Board expects the secretaries to have this matter printed. We expect everybody coming into our gates to pay to get in. Newspapers ought to be paid. My experience has been that the

best money that we have expended was expended for newspaper items. It will pay better than posters or fence-board advertising.

A Member: Mr. Chairman, I heartily concur in the remarks of the gentleman who has just taken his seat. I believe there is not a fair in the country that has not passed through an era of depression. I think that depression dates from the close of the World's Fair, and immediately following that the county fairs and district fairs almost all over the State met with disaster. A fair can exist if it has money enough to run it, and that money comes from the gate receipts and from the privileges, and every fair that goes down does so from the lack of funds. How can we better the condition and get the people to come who will pay and put the money into our treasury? That is the question. Now, then, local newspapers can do more for fair associations than any other method of advertising in the State. You have a newspaper in your town and you have a local correspondent in every neighborhood, and if the Secretary will see to it that he has a nice little item calling the attention of the people of that neighborhood to the fact that there is going to be a fair, and calling their attention to the fact that there is something going on a little unusual, and keep that up, you will have everybody know that there is going to be a fair. They read the correspondence of their neighborhood. They read it better than they do the columns of general news. They read it better than anything else, and I take it that when you secure their attention in that manner you are bringing it home to the people better than in any other way. I think the records as published in the State reports show that some fairs went out of existence naturally, others passed through an era of depression, but most fairs are coming to the front now. They have, however, the competition of the street fairs. I have been interested in another thing, and that is in regard to these professional exhibitors. Last fall we did not have any stock in our pens. We went over the county and solicited men to bring in their stock, and they said, "What's the use? When we fit our stock for exhibition and put it in the fair; we

meet these professional exhibitors, and it is no use for us to fit our stock for exhibition at the county fair." Now, then, this matter was brought up before our executive committee, and the impression was that we could get good receipts from the people in our county and territory closely surrounding it. The people do not come there to see these professional exhibits. They don't come there following a herd of cattle from this place, that place or the other place, but they come to see things from among our own people. Although our stock can not be brought up to the highest grade as exhibited by these professional people, yet it places one in competition with the other, and it is sufficient that when they go they have a chance to win something, and they can all get up their own stock in better condition for that reason perhaps. I take it that in the stock department, especially, the professional ought to keep out, notwithstanding that it can not be of as high a grade as that which comes with the professional men. When you do that you get the farmers in the neighborhood interested in it. When you have your county fair you have your stock in the pens, and it comes from a county where the people come from that pay the money that runs your fair.

Mr. Downing: I can not agree with the gentlemen who just spoke about the professional exhibitor. The professional exhibitor is as necessary to a successful fair as a local exhibitor. Now, I think the thing to do is to encourage both the local and the professional exhibitor, and, while you can not do it successfully at the county fair, like we would like to do it, still you can do it, and you can do it in this way: You can give the regular classes for professional exhibitors for competition, and then take, for instance, the age class in the beef breeds and the better breeds and give a premium for the best aged animal, a county premium or a local premium; confine the premium to the district. In this way you can show the local exhibitor that he is not up to the standard, or he is above. He has the standard brought in exhibition by the professional and he has his own animal, which gives him an op-

portunity to compare the two. Then, if the fair is an educational institution, you have some sort of a standard to go by—some sort of a standard to set up to show the local exhibitor whether or not he is up to the standard. I think in that way you can get the full benefit of these fairs. Now, I know there is a prejudice against the professional exhibitor, and I wish to read what I said on this subject last year. [Reads from report of last year.]

Now, I do not believe that you can have a successful fair if you close the gates against the professional exhibitor, because the people must have something there that will interest them. You can not take any sort of scrub stock there that will interest them. If you exclude the professional exhibitor, you are apt to have greatly inferior stock there, and you are apt to have very little of it. I think the happy medium is to have two classes; that would bring both classes of stock into the fair. Bear in mind that the successful fair must look to the people of the locality to make it successful. It is money absolutely wasted to advertise a fair outside of your own county. For instance, in our county we have 25,000 people. If we can get half the people of our county to give one day to the fair we can have a successful fair. So my idea is to advertise the fair in the local papers, and if you can get one-half or one-third of the people, you have a very successful fair, and you can only do this by advertising in the local papers. I think the suggestion a good one to have the management of the fair have articles prepared by special writers on any or some special subject. Making a good advertisement of the State Fair would help the local fairs, and if these articles were printed in the local papers it would thus work up a general interest all over the State in the county fairs, and would eventually benefit the State Fair.

Mr. Insley: There is one feature of the management of the average fair—the amusement feature, which has not received due consideration. I will say this: That three-fourths of those attending the average fair go there to be amused. You may talk about the educational features of your fair, but the gate receipts

come from the people who go there to be amused. You have got to offer them something or they won't go. Gentlemen may say just what they please against the speed department, but whenever the bell rings ninety-five out of every hundred get around the track. At our place we do not have very many people in the forenoon, but in the afternoon everybody comes out. It is the same way at the State Fair. The people of the city come out in the afternoons to see the races. They come out to be amused. Talk about fairs going down. You find a fair that is defunct and you will see a dilapidated race track. They have spent \$600, or \$800, or \$1,000 on it. If you want a successful race meeting offer a premium in the race department that is a credit to the association and you will see a crowd. Pay your premiums and you will see a successful fair.

A Member: I would like to say a few words. I find that what this gentleman has just been speaking about has not been the case with our fair. The speed department is kept up there, but it is the gambling and the kind of shows that have stood between the people and the fair association. Last year I was one of those appointed to look after the interests of the people there by the W. C. T. U. and the church, and I visited those places and found that they were questionable. The fair has not been a success in the past, although the track has been well kept up. The gambling and the questionable features contributed most largely to its poor success.

A Member: There is one matter in regard to the management of the county fair, and I believe it could be made a very strong matter. That is to try to work up an interest among the business men and the citizens of the community outside of the management of the fair. No fair can succeed that will go on without paying any attention to the needs and wants of the community. I have a case in point, and that is the fair in one particular locality in the State in which for a number of years the business men in the town were pretty largely interested in the management of the fair. The

directors were divided between the city and the country, and the merchants, and the banks, and the hotel keepers all worked for the fair. But by and by there sprung up a spirit of rivalry as between the city and country, and one crowd got hold of the fair for a time, and then the other crowd got hold of it, and finally it began to go down. Now, the point I want to make is this: We must interest and continue to interest all the elements of society among all the people. The county fair cannot be maintained unless it can be supported. The county fair can not be maintained when there is a feeling on one side or the other against some way of managing affairs. We all know there are ways and ways. I believe that the State Fair has been managed free from all objectionable features. I believe that our own interests and our surroundings make it incumbent upon us at all times to be careful as to what we allow as a part of an exhibit, but in doing that we must, as I said before, think all the time that we must interest all of the people in the community. We must have horse racing, and this kind of show and the other kind of show—things to attract the different classes of people. I believe that a committee from each fair association should wait upon the business men. One of the most successful fairs was the Kendallville Fair, and they have had a fair association which has had the support of the business men. Whenever a Kendallville citizen is met on the street he never fails to ask, "When are you coming to our fair?" or, "How many of your people are coming to our fair?" In that way they advertise their fair and make it a financial success. I find that one reason why fairs go down is that they lose the support of the community, and the only successful way, I believe, is to keep up that interest among the people. They will support the fair if they are properly encouraged.

Mr. Jones: I hardly believe that a clear-cut understanding has been had and that all have understood alike what is meant by the expression "professional exhibitors." My friend, Brother Downing, spoke of breeders who were breeding very fine animals as being

professional exhibitors. They are not in any sense whatever professional exhibitors as I understand a professional exhibitor. It is the men who gather up—buy here and there—certain specimens of stock and put them together in a herd, and don't pretend to grow them or raise them, and then take them to the fair and put them up there for exhibition, thereby discouraging those who furnish the products of their own handiwork. That is what constitutes a professional exhibitor. That class of exhibitors are of no value to any fair on earth. They never were in all the history of the world. You offer premiums, but when you have one of those professional men sweep down upon you and take all the premiums in the poultry, the stock exhibits, etc., why, what chance have the men at home? Now, it seems to me the fair managers ought to make a fair in the interest of the people in the locality where that fair is located, without reference to anybody else's interest. Then you get your home people interested. Your home people can raise just as good animals as any other. You make a competition; you build up agriculture. Then you get just exactly what every fair manager wants—everyone who is interested in the fair. You make them feel that it is their fair. I am a believer that the State of Indiana produces just as good of every commodity as the best. I believe that we are able to stand up and exhibit with anybody in the United States of America. Now then, your local fairs, county fairs and State fairs must have support; you must make your fairs a success. You must have receipts. Those receipts must mainly come from the gates. Now, I do not believe it is the proper thing for the fair to mainly attract people there for the purpose of entertaining them. There is a higher and a grander purpose. I believe the county commissioners have to help fair associations on their feet if the main purpose is to entertain. Really the fair, if carried on properly, may be a pertinent means of educating the farmer to a greater and wider appreciation of his business and thereby become an important factor in the building up of the State in the great industry of agriculture, and fair managers who do not hold this high ideal, it seems to me, are

making a very great mistake. You have got to hold the interest of and study what is best for the people who come there. Then you have a good fair; then the people come out; and if there is nothing but what the farmer and his family should see, then your fair is pure, instructive and beneficial. But when there is this trifling show and that attraction drawing your attention away from the things that elevate men, you are lowering the dignity of the State of Indiana.

The President: I presume that before adjourning it is in order to elect officers for the ensuing year and if there is no further discussion we are ready for nominations for President.

Mr. Mitchell: I move that the present officers be elected to serve for the ensuing year.

The motion was properly seconded and carried.

Mr. Nowlin: I thank you for the honor conferred upon me. For my part, and will try next year to have a program ready for publication. I think we have had a splendid meeting this afternoon, and I think we have all been benefited, and possibly, if we can get a program for next year ahead of time, we can improve on this meeting.

It was moved, seconded and carried that the convention adjourn.

SECOND SESSION.

Wednesday, January 9, 1901.

The meeting was called to order by President Jones.

Hon. W. W. Stevens, Chairman of the Auditing Committee, made the following report:

AUDITING COMMITTEE'S REPORT.

Your committee appointed to audit the receipts and expenditures of this Board for the past year beg leave to report that they have carefully and most thoroughly gone through the books of the Secretary and Treasurer, looking up the sources of all receipts, and each item of expenditure for the past year as well, and we find that the reports of these officers of the Board are correct in all things. We would suggest, however, that no premiums be paid by the Treasurer in bulk, as seems to have been the custom heretofore, but only upon proper warrant from the Secretary, as all other moneys are paid out.

Respectfully submitted,
W. W. STEVENS,
E. J. ROBISON,
E. A. ROBISON,
Committee.

A motion was made that the reports of the General Superintendents be submitted to the Secretary and filed without reading. The motion was seconded and carried.

Reports of department superintendents were filed.

The Board meeting was adjourned to 2 p. m.

REPORT TO DELEGATE BOARD OF SUPERINTENDENT OF ADMISSIONS.

In this my second report as Superintendent of Admissions, I have little additional to report.

The gates were practically closed on Monday, except that no admissions were taken. This was done that we might protect those people who had special privileges, and also to exclude undesirable visitors who would come in at that time and stow themselves away for the week.

The grounds were patrolled each morning, which gave us considerable gain in our receipts. The gates were also controlled at night when it seemed necessary, which also added to our income. These last two items added somewhat to the expense account of this department, but the returns, we think, fully justified the outlay. We would recommend the continuance of "the permits" to stock men and others who stay upon the grounds, as this is another saving to the society. If the permit system is continued and the grounds patrolled daily, as in the past two years, there will be an annual saving of many dollars. We believe further that each department superintendent should be responsible for the passes issued in his department, for he alone knows who is entitled to them and can act accordingly.

The expense in this department was \$432.57.

All of which is respectfully submitted.

E. A. ROBISON,
Superintendent.

REPORT OF SUPERINTENDENT OF GRAND STAND.

To the Officers and Members of the Indiana State Board of Agriculture.
Greeting:

As Superintendent of the department of the grand stand, I beg leave to submit the following report:

In assuming the duties of this position I at once considered and investigated the necessity of making some changes in the grand stand for the purpose of providing reserve seats, and by direction of the Board I made such changes as time and the opportunity allowed.

I find that the changes made were both popular and profitable, and I would recommend to my successor that he provide more reserve seat boxes for our next meeting and that a regular schedule of reserve seat prices be adopted and that a system of reserve seat tickets be provided, so that these accommodations can be successfully afforded to our patrons at our next meeting.

The expenses of this department this year for assistants, ticket takers, etc., was \$180.50.

I would recommend that the Superintendent be instructed several weeks before the fair to repair and repaint all of the chairs that are now in the grand stand.

Respectfully submitted,
J. E. McDONALD.

REPORT OF THE SUPERINTENDENT OF HORSES.

To the Delegate State Board of Agriculture:

Gentlemen—Your Superintendent of heavy draft, coach, light harness, carriage pairs of horses, ponies, saddle horses, and equipages submits the following report:

The number of entries in all of above named classes were unusually large, being 239 in all.

A majority of the animals on exhibition were of the very highest standard of excellence. The character of the exhibits far out-classed any previous exhibition, and it is greatly to the credit of our State and those adjoining that there is to be seen as marked improvement in the class of horses used by horse owners as there can be seen in cattle, hogs and sheep classes.

Two judges, of national reputation as good judges of all classes of horses, tied the awards.

The judges were Mr. Thomas W. Bell, superintendent of horse department, Union Stock Yards, Chicago, and Doctor Frank P. Remington, of New York city. Their awards gave very general satisfaction.

The expense of the department was \$186.50.

Very respectfully submitted,

MORTIMER LEVERING,

Superintendent.

REPORT OF SUPERINTENDENT OF DAIRY CATTLE AND DAIRY PRODUCTS.

The exhibit of dairy cattle was not as large as in some years, but was up to the average. The quality was better than ever before, was the expression heard from many. The judging gave universal satisfaction. The display in the dairy building was larger than usual and much interest was taken, especially in that of the exhibit of the working dairy of Purdue University, of Lafayette, Ind. The display of dairy products was good, but there was not the quantity that there should have been. There were 152 entries in this department. The expense was as follows: Judges, \$49.20; assistant superintendents, \$27.

COTT BARNETT,

Superintendent.

REPORT OF SUPERINTENDENT OF FINE ARTS.

To the President and Members of the Delegate Board of the Indiana State Board of Agriculture:

Gentlemen—I have the honor to submit to you the following report as Superintendent of Fine Arts department for the year 1900:

The number of entries was in excess of the number of entries in any former year, aggregating 1,796.

The receipts from sale of privileges in the hall were larger than usual, amounting to the sum of \$465.50.

I would respectfully recommend that the premium list be carefully examined by some person who is well acquainted in this department, and that such articles as are out of date be eliminated from the list and other new articles be added.

The expense of this department for judges was \$33.20, and assistant superintendents, \$326.45.

Respectfully submitted,

JOHN L. DAVIS,
Superintendent.

REPORT OF SUPERINTENDENT OF AGRICULTURE.

To the Delegate Board of Agriculture:

Gentlemen--In submitting this my annual report for the Agriculture department of the Indiana State Fair of 1900, allow me to say that it was a great success in almost every way.

In Class 37, grain and seeds, the exhibit never was better, especially the corn exhibit, which was as fine as was ever shown at any State fair. Especially the exhibits of corn by L. B. Clove and J. S. Overstreet, both of Franklin, Ind., whose display of corn was never equaled or excelled at any State Fair, or even at the great World's Fair at Chicago. The display of garden products was very good. This department should be encouraged, as every farmer and in fact everybody is interested in the production of the garden, and the production of vegetables should be encouraged in every way possible. The entries in this department were very large, there being 442.

Mr. ———, who was judge of the grain and seed department, and Ira B. Hurst, who was judge of the department of vegetable and root crops, gave general satisfaction. Following is expense in this department:

Judges	\$32 20
Assistants	35 00

Total expense	\$67 20
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Respectfully submitted,

J. C. HAINES.

REPORT OF SUPERINTENDENT OF MACHINERY.

With each succeeding year the exhibitors in this department increase in number and ask for enlarged space to display their exhibits. It seems to be the universal sentiment among exhibitors in this class that they are more liberally and courteously treated on the Indiana State Fair Grounds than anywhere else in the whole country.

But in order to keep up our reputation and accommodate all who desire to patronize our fair, the time has come when additional show space must be provided. We run far short of platted and desirable space the past season, and the Board will be compelled to enlarge the grounds set apart for machinery another year.

For lack of available and desirable space, exhibits have been crowded in among stock barns and other buildings, where they are out of place and detract from the orderly appearance of the grounds.

We would suggest that the entire grounds be replatted and extended farther westward into the timber, such timber as is in the way being removed, the streets nicely graded and graveled, water lines extended and every convenience possible arranged, so that every one wishing to exhibit on our grounds may be properly accommodated.

We would suggest that rules be established for the issuance of passes to exhibitors in this department, so that all may be treated alike and that the association may not be imposed upon.

There seems to be a tendency among exhibitors of farm machinery to have the same operated on the grounds, when it is possible to do so, along such lines as plows, cultivators, harrows and the like, and this feature should be encouraged, as it seems to be a very interesting and attractive one to a large number of visitors.

REPORT OF SUPERINTENDENT OF PRIVILEGES.

To the President and Members of the Delegate State Board of Agriculture:

Gentlemen—As Superintendent of Privileges for the year 1900 I desire to make the following report:

The plan of collecting in advance, or as nearly so as practicable, has proven very satisfactory.

The question of passes is the worst one to deal with in this department, and I hardly know just how to obviate it.

From my experience, I would recommend the following plan be considered: Issue no passes for privileges, but let each person pay entrance fees at the gate, the same as patrons of the fair. Then make a reduction in prices of the privileges accordingly. Issue one badge, good to stay on the grounds, for each five dollars paid for the privilege, and make no exceptions to either of these rules.

This would cut down the privilege money, but I believe would more than make it up in gate receipts.

I would recommend that permanent stands be built in Art Hall for rent, as that would make all stands uniform, and they will bring enough more rent to very soon pay for the outlay, and afterwards pay a good dividend on the investment.

In 1900 we collected and turned over to the Treasurer the sum of \$4,013.50, being about \$750 more than was ever collected before.

The expense of the department was \$50.50.

Respectfully submitted,

H. L. NOWLIN,
Superintendent of Privileges.

A motion was made and carried that the report of the Auditing Committee be accepted.

Report of Committee on President's address was read, and is as follows:

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Your Committee on President's Address have carefully considered same and most heartily concur in all the suggestions and recommendations contained therein looking to the broadening and enlargement of the sphere of usefulness of this agricultural board. We specially indorse the idea that the work of this Board should embrace considerably more than simply the holding of a fair each year, as there are many ways in which a State Board of Agriculture may enhance the general interests of agriculturists, horticulturists, and all who cultivate the soil.

We would further suggest that so much of said address as relates to the law under which this Board was organized and the purchase by the State of grounds we now hold by lease be printed and laid upon the desk of all members of the present Legislature and Committee on Agriculture. and that the Committee on Legislation see that these matters are properly presented to the consideration of all members of the present General Assembly.

ARCH STINSON,
JOHN L. DAVIS,
W. W. STEVENS,
Committee.

A motion was made and carried that the report of Committee on President's Address be adopted.

Report of Committee on Credentials read and is as follows:

REPORT OF COMMITTEE ON CREDENTIALS.

To the President and Members of the Indiana State Board of Agriculture
and Delegates to the Indiana State Board of Agriculture:

Gentlemen—We, the undersigned Committee on Credentials, beg leave
to submit the following list of delegates who are entitled to vote in this
body:

<i>Name of Fair.</i>	<i>Name of Delegate.</i>	<i>Postoffice Address.</i>
Angola	Emmett A. Bratton	Angola.
Anderson	Thomas B. Orr	Anderson.
Bainbridge	Jas. W. Edward	Bainbridge.
Boswell	M. A. McDonald.	
Bridgeton	J. W. Adams.	
Bedford	Geo. W. McDaniel	Bedford.
Boonville	C. Pelzer	Boonville.
Bourbon	J. E. McDonald	Ligonier.
Bremen		
Bloomington	C. R. Worrall	Bloomington.
Brazil	Wm. T. Beauchamp	Terre Haute.
Columbus	B. A. Brown	Columbus.
Cleona	J. B. Craven	Cleona.
Corydon	O. S. Huston	Rehaboth.
Chrisney	John C. Haines	Lake.
Cayuga		
Covington	Wm. K. Miles	Covington.
Crawfordsville	W. F. Hulet	Crawfordsville.
Crown Point	Fred. G. Wheeler	Crown Point.
Evansville	Robert Mitchell	Princeton.
Elwood	F. E. DeHority.	
East Enterprise	F. M. Miller	Laughery.
Fairmount		
Frankfort		
Franklin	John Tilson	Franklin.
Ft. Wayne	Geo. W. Kell	Ft. Wayne.
Flora		
Greenfield	Eph. Marsh	Greenfield.
Hagerstown	Knobe Porter	Hagerstown.
Huntingburg	Ernest W. Pickhardt	Huntingburg.
Huntington	Ben. F. Biliter	Huntington.
Kentland	H. A. Strohm	Kentland.
Kendallville	J. L. Dunning	Kendallville.
Logansport Driving Club		Logansport.
Lawrenceburg	W. H. O'Brien.	

<i>Name of Fair.</i>	<i>Name of Delegate.</i>	<i>Postoffice Address.</i>
Lebanon.....	Riley Hauser	Lebanon.
Liberty.....	H. F. McMahan.....	Liberty.
Lafayette.....	Wm. Blackstock	Lafayette.
Laporte.....	R. F. Small.....	Laporte.
Marengo.....	J. W. Bird	Marengo.
Middletown.....	E. M. Cooper	Mechanicsburg.
Muncie.....	C. H. Anthony.	
Madison.....	Vic Officer.....	Madison.
Marion.....	J. A. Gaunt	Marion.
North Vernon.....	A. A. Tripp	North Vernon.
Newtown.....	John Gray	Newtown.
New Castle.....	R. A. Smith	Greensboro.
New Albany.....	J. E. McDonald.....	Ligonier.
New Carlisle.....		
New Harmony.....	Geo. Taylor.....	New Harmony.
Osgood.....		
Oakland City.....	J. C. Haines.....	Rockport.
Porter.....	R. F. Small	Porter.
Poplar Grove.....		
Portland.....	C. O. Hardy.....	Portland.
Princeton.....	Robert Mitchell.....	Princeton.
Rushville.....	W. L. King.....	Rushville.
Riley.....	W. T. Beauchamp.....	Terre Haute.
Richmond.....	Knobe Porter.....	Hagerstown.
Rochester.....	Archibald Stinson.....	Rochester.
Ramelton.....		
Rockport.....	John C. Haines	Lake.
Remington.....		
Salem.....	W. W. Steven.	
Swayzee.....	E. C. King	Swayzee.
Sheridan.....	Cal. Sturdevant.....	Sheridan.
Shelbyville.....	Sidney Conger	Shelbyville.
Tipton.....	Jas. N. Waugh.....	Tipton.
Terre Haute.....	Wm. T. Beauchamp.....	Terre Haute.
Vincennes.....	Mason J. Niblack	Vincennes.
Winchester.....	A. C. Green.....	Winchester.
West Lebanon.....	M. A. McDonald.....	West Lebanon.
Vermillion.....	M. A. McDonald.	
Noble Co. Hort. and Agri.,		
Albion.....	J. L. Dunning.	
Cass Co. Hort., Logansport..	Cott Barnett.	
Marion Co. Hort and Agri..	W. B. Flick.....	Lawrence.
Lagrange Co. Hort. and Agri.	J. J. Gillette.....	Lagrange.
Floyd Co. Trotting and Fair		
Association.....		

<i>Name of Fair.</i>	<i>Name of Delegate.</i>	<i>Postoffice Address.</i>
St. Joseph Co. Hort	Aaron Jones.	
St. Joseph Co. Agri.	Aaron Jones.	
Union Co. Agri. and Hort. . .	H. F. McMahan	Fairfield.
Wayne Co. Agri. and Hort. . .	Walter S. Ratliff	Richmond.
Plainfield Agri. and Hort. . .	John Morgan	Plainfield.
Johnson Co. Hort	H. M. Stout	Trafalgar.
Putnam Co. Poultry Ass'n . .	J. W. Robe	Greencastle.
Marion Driving Ass'n	J. A. Gannett	Marion.
Monroe Co. Hort and Agri.		
Association	Ben. Kirby	Bloomington.
Western Ind. Race Track		
and Fair Association	M. A. McDonald	West Lebanon.
Grange Jubilee	D. P. Monroe.	

Respectfully submitted,

JOHN TILSON,
ROBERT MITCHELL,
W. T. BEAUCHAMP,
Committee.

It was moved and carried that the Committee on Credentials' report be accepted, and that the committee be retained for the consideration of further credentials that might come up.

ELECTION OF OFFICERS.

The Secretary announced that members of the Board were to be elected in the following districts: Fifth, Sixth, Seventh, Eighth, Ninth, Tenth, Eleventh, Twelfth and Thirteenth.

The following names were placed in nominations for the vacancies on the Board:

Fifth District, H. L. Nowlin; Sixth District, Knode Porter, Hon. J. C. Stevens; Seventh District, J. C. Robison; Eighth District, Sid Conger and Frank DeHority; Ninth District, W. T. Beauchamp; Tenth District, John Morgan, M. B. Waugh, J. C. Bridges and Oscar Hadley; Eleventh District, M. S. Claypool and John Truitt; Twelfth District, W. M. Blackstock; Thirteenth District, John L. Thompson and Joshua Strange.

The following tellers were appointed to collect and canvass the vote: Cal. Studevant, W. L. Hulitt and E. A. Bratton.

The result of the balloting was as follows:

Fifth District: H. L. Nowlin being the only nominee, the Secretary was authorized to cast the entire vote of the Board for his election.

Sixth District: Knode Porter received 50 votes, J. C. Stevens, 21 votes.

Seventh District: E. J. Robison being the only nominee, the Secretary was authorized to cast the entire vote for his election.

Eighth District: Sid Conger received 58 votes, Frank De-Hority, 15.

Ninth District: W. T. Beauchamp being the only nominee, the Secretary was instructed to cast the entire vote for his election.

Tenth District: J. C. Bridges received 42 votes, M. B. Waugh, 25; Oscar Hadley, 4; John Morgan, 1.

Eleventh District: John Truitt withdrew, and the Secretary was authorized to cast the entire ballot for M. S. Claypool, the only other nominee.

Twelfth District: W. M. Blackstock being the only nominee, the Secretary was instructed to cast the entire vote for his election.

Thirteenth District: John L. Thompson received 52 votes; Joshua Strange, 19.

UNFINISHED BUSINESS.

Robert Mitchell, Princeton: There ought to be a committee from this Board appointed to meet with the Agricultural Committee of the Legislature to see what can be done about the leased land at the State Fair Grounds. If the State has the title of the leased part of the ground, it would be better for the State to hold

the title for all of it. I move that the Chair appoint a committee of three to meet with the Agricultural Committee of the Legislature to try to settle this matter.

Mason J. Niblack: I think the matter can safely be left to the Board. I understand that Mr. Mitchell simply wants an expression of the Delegate Board.

Mr. Mitchell: That is the point I am making. I would like an expression from the Delegate Board.

No action was taken on the motion made by Mr. Mitchell.

MISCELLANEOUS BUSINESS.

President Jones called the attention of the members of the Association to the interstate commerce bill, known as Senate Bill No. 1439, or the "Cullom Bill," and the Grout House Bill No. 3713, and said:

The present tax on oleomargarine as it is made is two cents per pound. This bill provides that where oleomargarine is made without coloring it in imitation of butter, the tax shall be reduced to one-half cent a pound. Where attempts to defraud are made by using or selling oleomargarine as butter, the tax shall be ten cents per pound. This bill passed the House and was referred to the Agricultural Committee of the Senate. Since the third day of January that committee has been in session for the purpose of hearing the arguments on this measure.

From my standpoint as a farmer I believe the interests of agriculture in every State of this Union demand that this bill shall become a law. I believe our country butter and our other butter made by our factories should be sold upon its merits, and that oleomargarine should be sold upon its merits. I believe the passage of this bill would be worth a hundred thousand dollars to the farmers of the State of Indiana. There were sold in the markets of the United States last year a trifle over two billion pounds of this oleomargarine that absolutely took the place of butter.

I have a telegram from the Secretary of Agriculture, Mr. Wilson, asking me to come to Washington to make an argument before the committee considering this bill. I am going, and I am going to do my best to get a favorable report. If we can get the bill out of the hands of the committee, I am satisfied it will pass the United States Senate. It would seem to me that this delegate body should be heard in Washington. Why should not the Senators representing this State stand right upon this measure? It would seem to me that this matter would be proper for consideration.

There are other matters of importance before the Senate. The pending bill introduced by Senator Cullom, of Illinois, giving the power to the Interstate Commerce Commission to regulate and see that fair rates upon our railways was given to the people of this country is of immense importance to the farmers. Last winter from the first day of January through, that distinguished philanthropist and great business man of Chicago held a contract with the Central Traffic Association to ship wheat for 12 cents, while we of Indiana were paying from 18 to 20 cents.

This bill is before the Congress of the United States. It would seem to me proper and wise that an expression of this body, not only as the State Board proper, but as the Delegate Board and State Board in session, send a resolution urging our Representatives in Congress and in the United States Senate to vote for this measure. When the Grout bill was before Congress no member from Indiana, Democrat or Republican, cast a vote against it.

Mr. Flick, Marion County: I would move that our Senators and Congressmen from Indiana be urged by this Board to vote for both the bills the Chairman has mentioned, Senate Bill No. 1439 and House Bill No. 3713.

The motion was seconded and carried.

The President: I will present this matter to our Senators and Congressmen when I am in Washington next week.

President Jones: The ladies of this city would like to be heard through Mrs. Mary Moody of this city, upon a matter they are much interested in.

Mrs. Mary Moody, Indianapolis: We wish an appropriation from the Legislature for the building to be known as the Woman's Building, at the State Fair Grounds. There is an obstacle in the way of the appropriation, in the fact that the land belongs to the State Board. In speaking to the State Board last spring they said they would be willing to cede to the State the ground necessary for this building. We would like very much to have this Board say that it will cede the ground to the State if the appropriation is secured for the building.

President Jones: The State of Illinois has built upon the State Fair Grounds a very beautiful building costing eight or nine thou-

sand dollars for a similar purpose. It is a beautiful building and well adapted for the purposes it was intended, and during and before and after the State Fair the management has conducted a culinary school for the purpose of instructing ladies of that State as to the best methods of cooking, and they have provided that each county in the State should select one young lady to have the benefit of this course. I visited the Illinois State Fair Grounds last summer, and this building was shown me with a great deal of pride by the management. They said that through this building they had interested the women in every county of the State. Our ladies in this State believe we are entitled to the same consideration by the legislative branch as they are in Illinois. They would like a similar building, and are using their influence—and it is quite considerable—before the Legislature, trying to get a special appropriation for this building that it might interest the women all through the State. They believe, and we believe, that such an enterprise would be a great benefit to the State.

W. W. Stevens: I move you that this Delegate Board recommend to the State Board that they cede a space for this building to the State in case the Legislature makes an appropriation for the building.

Motion seconded and carried by the unanimous vote of the Delegate Board.

The meeting was then adjourned sine die.

The following is a report of the awards made at the State Fair of 1900:

INDIANA STATE FAIR, 1900.

DEPARTMENT A. SPEED.

W. T. BEAUCHAMP, Superintendent.
M. A. McDONALD, Starting Judge.

C. R. WORRALL, }
J. J. INSLEY, } Judges.
JOHN BEGGS, }

W. W. MORGAN, }
W. A. BROWN, } Timers.

F. A. WISEHART, Clerk of Course.

AWARDS.

TUESDAY, SEPTEMBER 18.

2:30 Trot—\$500 divided—\$250.00, \$125.00, \$75.00 and \$50.00.

Crito, b. g.....	1	1	1
Hydrostin, ch. m.....	5	2	2
Joe Steiner, s. g.....	2	4	4
Fannie Riley, ch. m.....	3	3	9
Little Helen, b. m.....	4	5	3
Plural, b. m.....	10	11	5
Mattie W, b. m.....	6	10	7
Lina Wilson, b. m.....	8	6	10
Stella B., br. m.....	9	7	6
Cricket, blk. m.....	7	9	11
Hamward, b. h.....	11	8	8

TIME.

	¼ Mile.	½ Mile.	¾ Mile.	Mile.
First heat.....	:34¾	1:09	1:43¾	2:17½
Second heat.....	:34¾	1:08	1:40¾	2:15¾
Third heat.....	:34½	1:09½	1:39¼	2:18

2:09 Pace—\$800 divided—\$400.00, \$200.00, \$120.00 and \$80.00.

Coastman, b. h.....	1	1	1
Ruby Mack, g. m.....	5	2	3
Lizzie S., blk. m.....	2	4	4
Argetta, ch. m.....	4	5	2
Sophia, b. m.....	3	3	5

TIME.

	¼ Mile.	½ Mile.	¾ Mile.	Mile.
First heat.....	:32½	1:03¼	1:35½	2:08¾
Second heat.....	:32½	1:03¾	1:36½	2:09¾
Third heat.....	:32¼	1:04¼	1:37	2:10½

2:20 Trot—\$600.0 divided—\$300.00, \$150.00, \$90.00 and \$60.00.

Tell Tale, s. m.....	1	1	1
Mary C., b. m.....	2	2	4
Miss Dean, b. m.....	3	3	2
Sallie Simpson, b. m.....	5	4	3
Estella, b. m.....	4	7	7
Pate, br. h.....	6	5	6
Jack, b. g.....	7	6	5
May Allen, s. m.....	Dis.		

TIME.

	¼ Mile.	½ Mile.	¾ Mile.	Mile.
First heat.....	:34	1:08¼	1:43¾	2:17¼
Second heat.....	:34	1:08	1:42½	2:16½
Third heat.....	:34½	1:09¼	1:43¾	2:17¼

WEDNESDAY, SEPTEMBER 19.

2:25 Pace—\$500.00 divided—\$250.00, \$125.00, \$75.00 and \$50.00.

Sufret, blk. m.....	1	1	1
Rube Johnson.....	2	2	3
Hello, blk. g.....	7	3	2
Tommy Mac., b. g.....	3	8	4
Paris W., b. h.....	6	4	5
Julia McR., b. m.....	8	7	6
Linwood.....	5	5	7
Cycl H., s. g.....	4	6	8
Nellie Thomas, gr. m.....	Dis.		



TIME.

	¼ Mile.	½ Mile.	¾ Mile.	Mile.
First heat.....	:34½	1:09¼	1:44½	2:20¼
Second heat.....	:33¾	1:09½	1:45	2:21¼
Third heat.....	:34¼	1:10	1:46	2:21¾

2:17 Pace—\$600.00 divided—\$300.00, \$150.00, \$90.00 and \$60.00.

Earl Park, b. g.....	5	1	1	1
Ladoga Boy, gr. g.....	1	2	4	2
Chestnut, s. g.....	3	6	2	3
Ethlyn C., s. m.....	2	4	3	4
Glad Boy, blk. g.....	4	5	Dr.	
Frank McKinney b. g.	6	3	Dls.	
Lena F., s. m.....	Dis.			
So Sure, b. h.....	Dis.			
Katherine M., s. m.....	Dis.			

TIME.

	¼ Mile.	½ Mile.	¾ Mile.	Mile.
First heat.....	:33¾	1:08	1:42	2:17
Second heat.....	:33¾	1:08¼	1:42	2:16¼
Third heat.....	:34¾	1:08¾	1:43	2:21
Fourth heat.....	:33¾	1:07¾	1:43	2:20

FRIDAY, SEPTEMBER 21.

Special Pace—\$2,000.00 divided—60 per cent. and 40 per cent.

Distance, 40 yards. No entrance.

Searchlight, b. h.....	1	1
Anaconda, b. g.....	2	Dls.

TIME.

	¼ Mile.	½ Mile.	¾ Mile.	Mile.
First heat.....	:30¾	1:06	1:38½	2:12
Second heat.....	:33½	1:08¼	1:41¼	2:14

The 2:10 trotting race, purse \$800, and the free-for-all trotting race, purse \$800, failed to fill satisfactorily, and were declared off.

The 2:14 pacing race, purse \$600; the 2:25 trotting race, purse \$500; the free-for-all pacing class, purse \$800; the 2:15 race, purse \$600; the 2:21 pacing race, purse \$500, were declared off on account of heavy track and bad weather.

DEPARTMENT B.—HORSES.

CLASS I—French Draft and Percheron.

(G. W. Bell, Judge, Union Stock Yards, Chicago, Ill.)

STALLIONS.

Four years old and over, Robert Burgess & Son, Wenona, Ill.....	\$25 00
Second premium, Lew W. Cochran, Crawfordsville, Ind.....	15 00
Three years old and under four, Geo. Sangster, Monticello, Ind....	15 00
Second premium, Robert Burgess & Son, Wenona, Ill.....	10 00
Third premium, Robert Longfellow, Ging, Ind.....	6 00
Two years old and under three, Robert Burgess & Son, Wenona, Ill.	12 00
Second premium, Lew W. Cochran, Crawfordsville, Ind.....	8 00
Third premium, George Sangster, Monticello, Ind.....	5 00
One year old and under two, Robert Burgess & Son, Wenona, Ill...	10 00
Second premium, Robert Burgess & Son, Wenona, Ill.....	6 00
Third premium, Lew W. Cochran, Crawfordsville, Ind.....	4 00
Stallion showing four best colts under 4 years.....	

MARES AND FILLIES.

Four years old and over, W. D. Wiley, Greenwood, Ind.....	25 00
Second premium, W. D. Wiley, Greenwood, Ind.....	15 00
Three years old and under four.....	

CLASS II—Clydesdale and English Shires.

(G. W. Bell, Judge, Union Stock Yards, Chicago, Ill.)

STALLIONS.

Four years old and over, Robert Burgess & Son, Wenona, Ill.....	\$25 00
Three years old and under four, Robert Burgess & Son, Wenona, Ill.	15 00
Second premium, Lew W. Cochran, Crawfordsville, Ind.....	10 00
Two years old and under three, Robert Burgess & Son, Wenona, Ill.	12 00
Second premium, Lew W. Cochran, Crawfordsville, Ind.....	8 00
Third premium, Robert Burgess & Son, Wenona, Ill.....	5 00
One year old and under two, Lew W. Cochran, Crawfordsville, Ind.	10 00
Second premium, Robert Burgess & Son, Wenona, Ill.....	3 00
Stallion showing four best colts under four years, Robert Burgess & Son, Wenona, Ill.....	25 00

MARES AND FILLIES.

Four years old and over, Lew W. Cochran, Crawfordsville, Ind.....	25 00
One year old and under two, Lew W. Cochran, Crawfordsville, Ind.	10 00

CLASS III—French and German Coach.

(G. W. Bell, Judge, Union Stock Yards, Chicago, Ill.)

STALLIONS.

Four years old and over, Law & Young, Crawfordsville, Ind.....	\$25 00
Second premium, J. Crouch & Son, Lafayette, Ind.....	15 00
Three years old and under four, J. Crouch & Son, Lafayette, Ind...	15 00
Two years old and under three, J. Crouch & Son, Lafayette, Ind...	12 00
Stallion showing four colts under four years, Law & Young, Crawfordsville, Ind.....	25 00

MARES AND FILLIES.

Three years old and under four, Law & Young, Crawfordsville, Ind.	15 00
Two years old and under three, J. Crouch & Son, Lafayette, Ind...	12 00

CLASS IV—Cleveland Bay, Hackney and American Coach.

(G. W. Bell, Judge, Union Stock Yards, Chicago, Ill.)

STALLIONS.

Four years old and over, Bert Myers, Greenwood, Ind.....	\$25 00
Second premium, J. R. Peak & Son, Winchester, Ill.....	15 00
Third premium, J. Crouch & Son, Lafayette, Ind.....	10 00
Three years old and under four, Lew W. Cochran, Crawfordsville, Ind.....	15 00
Second premium, A. C. Turner, Ross, Ohio.....	10 00
Third premium, Ira Doggett, Howland, Ind.....	8 00
Two years old and under three, Lew W. Cochran, Crawfordsville	12 00
Second premium, Robert Burgess & Son, Wenona, Ill.....	8 00
Third premium, Lew W. Cochran, Crawfordsville, Ind.....	5 00
One year old and under two, Lew W. Cochran, Crawfordsville, Ind.	10 00
Second premium, Lew W. Cochran, Crawfordsville, Ind.....	6 00
Third premium, Thos. G. Disher, Indianapolis, Ind.....	4 00
Stallion showing four best colts under four years, J. R. Peak & Son, Winchester, Ill.....	25 00
Second premium, J. R. Peak & Son, Winchester, Ill.....	15 00

MARES AND FILLIES.

Four years old and over, J. R. Peak & Son, Winchester, Ill.	25 00
Second premium, J. R. Peak & Son, Winchester, Ill.	15 00
Third premium, Hiram Howland, Howland, Ind.	10 00
Three years old and under four, Robert Burgess & Son, Wenona, Ill.	15 00
Second premium, R. W. Sanford, Whitestown, Ind.	10 00
Third premium, J. R. Peak & Son, Winchester, Ill.	6 00
Two years old and under three, J. R. Peak & Son, Winchester, Ill..	12 00
Second premium, A. C. Turner, Ross, Ohio.	8 00
One year old and under two, J. R. Peak & Son, Winchester, Ill.	10 00
Second premium, J. R. Peak & Son, Winchester, Ill.	6 00

CLASS V—Light Harness Horses.

(G. W. Bell, Judge, Union Stock Yards, Chicago, Ill.)

STALLIONS.

Four years old and over, Robert Longfellow, Ging, Ind.	\$25 00
Second premium, J. R. Peak & Son, Winchester, Ill.	15 00
Third premium, S. J. Fleming, Terre Haute, Ind.	10 00
Three years old and under four, Jas. L. Bradley, Indianapolis, Ind.	15 00
Second premium, A. C. Turner, Ross, Ohio.	10 00
Third premium, Ira Doggett, Howland, Ind.	8 00
Two years old and under three, Wm. Dagler, Rushville, Ind.	12 00
Second premium, J. B. Disher, Indianapolis, Ind.	8 00
One year old and under two, J. R. Peak & Son, Winchester, Ill.	10 00
Second premium, A. C. Turner, Ross, Ohio.	6 00
Third premium, J. H. Trees, Warrington, Ind.	4 00
Stallion showing four best colts under four years, J. R. Peak & Son, Winchester, Ill.	25 00
Second premium, J. R. Peak & Son, Winchester, Ill.	15 00
Third premium, Wm. Dagler, Rushville, Ind.	10 00

MARES AND FILLIES.

Four years old and over, J. R. Peak & Son, Winchester, Ill.	25 00
Second premium, Wm. Jessup, Friendswood, Ind.	15 00
Third premium, Otis C. Hann, Indianapolis, Ind.	10 00
Three years old and under four, J. R. Peak & Son, Winchester, Ill..	15 00
Second premium, Wm. Dagler, Rushville, Ind.	10 00
Third premium, J. R. Peak & Son, Winchester, Ill.	6 00
Two years old and under three, J. R. Peak & Son, Winchester, Ill.	12 00
Second premium, J. R. Peak & Son, Winchester, Ill.	8 00
Third premium, A. C. Turner, Ross, Ohio.	5 00

One year old and under two, J. R. Peak & Son, Winchester, Ill...	10 00
Second premium, J. R. Peak & Son, Winchester, Ill.....	6 00
Third premium, J. R. Peak & Son, Winchester, Ill.....	4 00
Mare and two of her progeny three years old or under, J. R. Peak & Son, Winchester, Ill.....	25 00
Second premium, Hiram Howland, Howland, Ind.....	15 00
Third premium, Wm. Dagler, Rushville, Ind.....	10 00

GELDINGS.

Four years old and over, M. H. Rearden, Indianapolis, Ind.....	25 00
Second premium, Hiram Howland, Howland, Ind.....	15 00
Third premium, M. H. Rearden, Indianapolis, Ind.....	10 00
Three years old and under four, Robert Burgess & Son, Wenona, Ill.	15 00
Second premium, J. R. Peak & Son, Winchester, Ill.....	10 00
Two years old and under three, J. W. Denton, Indianapolis, Ind...	12 00
Second premium, Wm. Dagler, Rushville, Ind.....	8 00
Third premium, Hiram Howland, Howland, Ind.....	5 00

CLASS VI—Coach and Carriage Pair, Roadsters and Saddlers.

(G. W. Bell, Judge, Union Stock Yards, Chicago, Ill.)

Coach or carriage pair, Robert Burgess & Son, Wenona, Ill.....	\$30 00
Second premium, J. R. Peak & Son, Winchester, Ill.....	20 00
Single roadster (mare), Otis C. Hann, Indianapolis, Ind.....	30 00
Second premium, T. J. Richardson, Indianapolis, Ind.....	20 00
Third premium, Jas. L. Bradley, Indianapolis, Ind.....	10 00
Single roadster (gelding), M. H. Rearden, Indianapolis, Ind.....	30 00
Second premium, M. H. Rearden, Indianapolis, Ind.....	20 00
Third premium, Hiram Howland, Howland, Ind.....	10 00
Double roadster, J. R. Peak & Son, Winchester, Ill.....	30 00
Second premium, A. C. Turner, Ross, Ohio.....	20 00
Third premium, Hiram Howland, Howland, Ind.....	10 00
Saddle stallion, John L. Fulton, Florence, Ky.....	30 00
Second premium, J. M. Clark, Dwight, Ill.....	20 00
Saddle mare, J. W. Denton, Indianapolis, Ind.....	30 00
Second premium, J. M. Clark, Dwight, Ill.....	20 00
Third premium, J. Duckworth, Martinsville, Ind.....	10 00
Saddle gelding, Mrs. H. C. Knode, Indianapolis, Ind.....	30 00
Second premium, J. W. Denton, Indianapolis, Ind.....	20 00
Third premium, J. M. Clark, Dwight, Ill.....	10 00
Best saddle stallion, mare or gelding, Mrs. H. C. Knode, Indianap- olis, Ind.....	50 00

CLASS VII—Ponies, All Breeds.

(G. W. Bell, Judge, Union Stock Yards, Chicago, Ill.)

Pony, 11 hands or under, in single harness, Russell Brouse, Indianapolis, Ind.....	\$10 00
Second premium, Sylvester Johnson, Indianapolis, Ind.....	5 00
Third premium, Agatha N. Reid, Indianapolis, Ind.....	
Pony, 11 to 13 hands, in single harness, Miss Hilda Fletcher, Indianapolis, Ind.....	10 00
Second premium, Westley Wilson, Indianapolis, Ind.....	5 00
Pony, 13 to 14½ hands, in single harness, Lew W. Cochran, Crawfordsville, Ind.....	10 00
Second premium, W. B. Blaer, Indianapolis, Ind.....	5 00
Mare and colt	

EQUIPAGES.

Two horses, two-seated equipage, Robert Burgess & Son, Wenona, Ill.	\$20 00
Second premium, Jas. L. Bradley, Indianapolis, Ind.....	15 00
Third premium, J. R. Peak & Son, Winchester, Ill.....	10 00
One horse, one-seated equipage for lady, R. W. Sandford, Whites-town	15 00
Second premium, H. H. Gates, Indianapolis, Ind.....	12 00
Third premium, Otis C. Hann, Indianapolis, Ind.....	7 00
Vehicle for children, Lew W. Cochran, Crawfordsville, Ind.....	15 00
Second premium, Russell Brouse, Indianapolis, Ind.....	12 00
Third premium, Miss Hilda Fletcher, Indianapolis, Ind.....	7 00

DEPARTMENT C.—CATTLE. (BEEF BREEDS.)

CLASS IX—Shorthorn and Polled Durhams.

(C. L. Gerlaugh, Judge, Osborne, Ohio.)

BULLS.

Three years old and over, E. S. Kelly, Yellow Springs, Ohio.....	\$50 00
Second premium, T. J. Wornall, Mosby, Mo.....	30 00
Third premium, Aaron Barber, Avon, N. Y.....	10 00
Two years old and under three, J. G. Robbins & Sons, Horace, Ind.	40 00
Second premium, E. B. Mitchell & Sons, Danvers, Ill.....	20 00
Third premium, Wm. A. Boland, New York, N. Y.....	8 00
One year old and under two, J. G. Robbins & Sons, Horace, Ind.	30 00
Second premium, J. O. Stout, Hollandsburg, Ind.....	12 00
Third premium, Frank Cotton, Manilla, Ind.....	6 00
Calf, under one year, J. G. Robbins & Sons, Horace, Ind.....	16 00
Second premium, Wm. A. Boland, New York, N. Y.....	6 00
Third premium, J. D. Douglass & Son, Sulphur Hill, Ind.....	4 00

COWS AND HEIFERS.

Three years old and over, T. J. Wornall, Mosby, Mo.....	50 00
Second premium, Aaron Barber, Avon, N. Y.....	30 00
Third premium, E. S. Kelly, Yellow Springs, Ohio.....	10 00
Two years old and under three, T. J. Wornall, Mosby, Mo.....	40 00
Second premium, E. B. Mitchell & Sons, Danvers, Ill.....	20 00
Third premium, Aaron Barber, Avon, N. Y.....	8 00
One year old and under two, J. G. Robbins & Sons, Horace, Ind...	30 00
Second premium, J. G. Robbins & Sons, Horace, Ind.....	12 00
Third premium, T. J. Wornall, Mosby, Mo.....	6 00
Calf, under one year, Aaron Barber, Avon, N. Y.....	16 00
Second premium, T. J. Wornall, Mosby, Mo.....	6 00
Third premium, J. D. Douglass & Son, Sulphur Hill, Ind.....	4 00
Four animals, either sex, the get of one sire, J. G. Robbins & Sons, Horace, Ind.....	40 00
Second premium, E. B. Mitchell & Sons, Danvers, Ill.....	20 00
Third premium, Wm. A. Boland, New York, N. Y.....	8 00
Two animals, either sex, the produce of one cow, E. B. Mitchell & Sons, Danvers, Ill.....	40 00
Second premium, Wm. A. Boland, New York, N. Y.....	20 00

Third premium, Aaron Barber, Avon, N. Y.....	8 00
Exhibitor's herd, T. J. Wornall, Mosby, Mo.....	100 00
Second premium, Aaron Barber, New York, N. Y.....	50 00
Breeder's herd, J. G. Robbins & Sons, Horace, Ind.....	100 00
Second premium, Frank Cotton, Manilla, Ind.....	50 00

SWEEPSTAKES.

Best bull, any age, J. G. Robbins & Sons, Horace, Ind.....	50 00
Best cow or heifer, any age, J. G. Robbins & Sons, Horace, Ind....	50 00

SPECIAL CLASS—Cattle, Beef.

SHORTHORNS.

Bull calf six months and under twelve, Wm. N. Randall & Son, Brick Chapel, Ind.....	\$40 00
Second premium, J. G. Robbins & Sons, Horace, Ind.....	30 00
Third premium, J. G. Robbins & Sons, Horace, Ind.....	20 00
Fourth premium, S. R. Quick & Son, Brooklyn, Ind.....	15 00
Fifth premium, E. C. Thompson, Irvington, Ind.....	10 00
Bull calf under six months, J. G. Robbins & Sons, Horace, Ind....	30 00
Second premium, E. C. Thompson, Irvington, Ind.....	20 00
Third premium, W. F. Christian, Indianapolis, Ind.....	15 00
Fourth premium, W. F. Christian, Indianapolis, Ind.....	10 00
Heifer calf six months and under twelve, J. D. Douglas & Son, Sulphur Hill, Ind.....	40 00
Second premium, J. G. Robbins & Sons, Horace, Ind.....	30 00
Third premium, J. D. Douglas & Son, Sulphur Hill, Ind.....	20 00
Fourth premium, Joe Witter, College Corner, Ohio.....	15 00
Fifth premium, E. S. Folsom, Indianapolis, Ind.....	10 00
Heifer calf under six months, J. D. Douglas & Son, Sulphur Hill..	30 00
Second premium, W. F. Christian, Indianapolis, Ind.....	20 00
Third premium, Kinsey & Thorn, Noblesville, Ind.....	15 00
Fourth premium, J. G. Robbins & Sons, Horace, Ind.....	10 00
Fifth premium, J. O. Stout, Hollandsburg, Ind.....	5 00

CLASS X—Herefords.

(T. L. Seroggin, Judge, Decatur, Ill.)

BULLS.

Three years old and over, Clem Graves, Bunker Hill, Ind.....	\$15 00
Second premium, Clem Graves, Bunker Hill, Ind.....	10 00
Third premium, H. F. Schnelker, New Haven, Ind.....	5 00

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Two years old and under three, Clem Graves, Bunker Hill, Ind.	10 00
Second premium, John Hooker, New London, Ohio.	7 00
One year old and under two, John Hooker, New London, Ohio.	8 00
Second premium, H. E. Watson, Edinburg, Ind.	6 00
Third premium, Clem Graves, Bunker Hill, Ind.	3 00
Calf under one year old, Clem Graves, Bunker Hill, Ind.	5 00
Second premium, John Hooker, New London, Ohio.	3 00
Third premium, H. F. Schnelker, New Haven, Ind.	2 00

COWS AND HEIFERS.

Three years old and over, John Hooker, New London, Ohio.	15 00
Second premium, Clem Graves, Bunker Hill, Ind.	10 00
Third premium, Clem Graves, Bunker Hill, Ind.	5 00
Two years old and under three, Clem Graves, Bunker Hill, Ind.	10 00
Second premium, John Hooker, New London, Ohio.	7 00
Third premium, Clem Graves, Bunker Hill, Ind.	4 00
One year old and under two, John Hooker, New London, Ohio.	8 00
Second premium, John Hooker, New London, Ohio.	6 00
Third premium, Clem Graves, Bunker Hill, Ind.	3 00
Calf under one year old, Clem Graves, Bunker Hill, Ind.	5 00
Second premium, John Hooker, New London, Ohio.	3 00
Third premium, Clem Graves, Bunker Hill, Ind.	2 00
Four animals, either sex, the get of one sire, Clem Graves, Bunker Hill, Ind.	10 00
Second premium, Clem Graves, Bunker Hill, Ind.	7 00
Third premium, Clem Graves, Bunker Hill, Ind.	4 00
Two animals, either sex, the produce of one cow, Clem Graves, Bunker Hill, Ind.	10 00
Second premium, John Hooker, New London, Ohio.	7 00
Third premium, Clem Graves, Bunker Hill, Ind.	4 00
Exhibitor's herd, Clem Graves, Bunker Hill, Ind.	20 00
Second premium, John Hooker, New London, Ohio.	10 00
Breeder's herd, John Hooker, New London, Ohio.	20 00
Second premium, Clem Graves, Bunker Hill, Ind.	10 00

SWEEPSTAKES.

Best bull, any age, Clem Graves, Bunker Hill, Ind.	20 00
Best cow or helper, any age, Clem Graves, Bunker Hill, Ind.	20 00

CLASS XI—Aberdeen-Angus.

(J. G. Imbodin, Judge.)

BULLS.

Three years old and over, A. C. Binnie, Alta, Ia.....	\$15 00
Second premium, D. Bradfute & Son, Cedarville, Ohio.....	10 00
Two years old and under three, Henderson & Son, Lebanon, Ind..	10 00
One year old and under two, D. Bradfute & Son, Cedarville, Ohio..	8 00
Second premium, A. C. Binnie, Alta, Ia.....	6 00
Third premium, J. E. West, Sheridan, Ind.....	3 00
Calf, under one year old, A. C. Binnie, Alta, Ia.....	5 00
Second premium, D. Bradfute & Son, Cedarville, Ohio.....	3 00
Third premium, Henderson & Son, Lebanon, Ind.....	2 00

COWS AND HEIFERS.

Three years old and over, D. Bradfute & Son, Cedarville, Ohio....	15 00
Second premium, A. C. Binnie, Alta, Ia.....	10 00
Third premium, Henderson & Son, Lebanon, Ind.....	5 00
Two years old and under three, A. C. Binnie, Alta, Ia.....	10 00
Second premium, D. Bradfute & Son, Cedarville, Ohio.....	7 00
Third premium, Henderson & Son, Lebanon, Ind.....	4 00
One year old and under two, D. Bradfute & Son, Cedarville, Ohio..	8 00
Second premium, A. C. Binnie, Alta, Ia.....	6 00
Third premium, D. Bradfute & Son, Cedarville, Ohio.....	3 00
Calf, under one year old, A. C. Binnie, Alta, Ia.....	5 00
Second premium, D. Bradfute & Son, Cedarville, Ohio.....	3 00
Third premium, A. C. Binnie, Alta, Ia.....	2 00
Four animals, either sex, the get of one sire, D. Bradfute & Son, Cedarville, Ohio.....	10 00
Second premium, A. C. Binnie, Alta, Ia.....	7 00
Two animals, either sex, the produce of one cow, A. C. Binnie, Alta, Ia.....	10 00
Second premium, D. Bradfute & Son, Cedarville, Ohio.....	7 00
Exhibitor's herd, A. C. Binnie, Alta, Ia.....	20 00
Second premium, D. Bradfute & Son, Cedarville, Ohio.....	10 00
Breeder's herd, D. Bradfute & Son, Cedarville, Ohio.....	20 00
Second premium, A. C. Binnie, Alta, Ia.....	10 00

SWEEPSTAKES.

Best bull, any age, A. C. Binnie, Alta, Ia.....	20 00
Best cow or helper, any age, D. Bradfute & Son, Cedarville, Ohio..	20 00

CLASS XII—Galloways.

(Othle Ray, Judge, Wellsboro, Ind.)

BULLS.

Three years old and over.....	
Two years old and under three, Marion Parr, Cooksville, Ill.....	\$10 00
One year old and under two, Marion Parr, Cooksville, Ill.....	8 00
Calf, under one year old, Marion Parr, Cooksville, Ill.....	5 00

COWS AND HEIFERS.

Three years old and over, Marion Parr, Cooksville, Ill.....	15 00
Second premium, Marion Parr, Cooksville, Ill.....	10 00
Third premium, Marion Parr, Cooksville, Ill.....	5 00
Two years old and under three, Marion Parr, Cooksville, Ill.....	10 00
One year old and under two, Marion Parr, Cooksville, Ill.....	8 00
Second premium, Marion Parr, Cooksville, Ill.....	6 00
Calf, under one year old.....	5 00
Second premium, Marion Parr, Cooksville, Ill.....	3 00
Four animals, either sex, the get of one sire, Marion Parr, Cooksville, Ill.....	10 00
Two animals, either sex, the produce of one cow, Marion Parr, Cooksville, Ill.....	10 00
Second premium, Marion Parr, Cooksville, Ill.....	7 00
Exhibitor's herd, Marion Parr, Cooksville, Ill.....	20 00
Breeder's herd, Marion Parr, Cooksville, Ill.....	20 00

SWEEPSTAKES.

Best bull, any age, Marion Parr, Cooksville, Ill.....	20 00
Best cow or heifer, any age, Marion Parr, Cooksville, Ill.....	20 00

CLASS XIII—Red Polls.

(Robert Mitchell, Judge, Princeton, Ind.)

BULLS.

Three years old and over, Andrew Bros., Cedarville, O.....	\$10 00
Two years old and under three, Andrew Bros., Cedarville, O.....	7 00
One year old and under two, Andrew Bros., Cedarville, O.....	8 00
Calf, under one year old, Andrew Bros., Cedarville, O.....	5 00

COWS AND HEIFERS.

Three years old and over, Andrew Bros., Cedarville, O.....	10 00
Second premium, Andrew Bros., Cedarville, O.....	5 00
Two years old and under three, Andrew Bros., Cedarville, O.....	7 00
Second premium, Andrew Bros., Cedarville, O.....	4 00
One year old and under two, Andrew Bros., Cedarville, O.....	5 00
Second premium, Andrew Bros., Cedarville, O.....	3 00
Calf, under one year old, Andrew Bros., Cedarville, O.....	5 00
Second premium, Andrew Bros., Cedarville, O.....	3 00
Four animals, either sex, the get of one sire, Andrew Bros., Cedarville, O.....	8 00
Second premium, Andrew Bros., Cedarville, O.....	4 00
Two animals, either sex, the produce of one cow, Andrew Bros., Cedarville, O.....	8 00
Second premium, Andrew Bros., Cedarville, O.....	4 00
Exhibitor's herd, Andrew Bros., Cedarville, O.....	10 00
Second premium, Andrew Bros., Cedarville, O.....	5 00
Breeder's herd, Andrew Bros., Cedarville, O.....	10 00

SWEEPSTAKES.

Best bull, any age, Andrew Bros., Cedarville, O.....	10 00
Best cow or heifer, any age, Andrew Bros., Cedarville, O.....	10 00

CLASS XIV—Open to All Beef Breeds.

(C. L. Gerlaugh, J. G. Imboden, T. J. Seroggin, Judges.)

GRAND SWEEPSTAKES.

Best bull, any age or breed, Clem Graves, Bunker Hill, Ind.....	\$50 00
Best cow or heifer, any age or breed, D. Bradfute & Son, Cedarville, Ohio	50 00

DEPARTMENT D.—CATTLE. (DAIRY BREEDS.)

CLASS XV—Jerseys.

BULLS.

Three years old and over, H. N. Higginbotham, Joliet, Ill.	\$20 00
Second premium, Biltmore Farms, Biltmore, N. C.	12 00
Third premium, W. J. Wright, New Castle, Ind.	6 00
Two years old and under three, Biltmore Farms, Biltmore, N. C.	15 00
Second premium, H. N. Higginbotham, Joliet, Ill.	10 00
Third premium, W. J. Wright, New Castle, Ind.	5 00
One year old and under two, J. E. Robbins, Greensburg, Ind.	10 00
Second premium, Biltmore Farms, Biltmore, N. C.	7 00
Third premium, H. N. Higginbotham, Joliet, Ill.	4 00
Calf, under one year old, H. N. Higginbotham, Joliet, Ill.	7 00
Second premium, Biltmore Farms, Biltmore, N. C.	5 00
Third premium, W. J. Wright, New Castle, Ind.	3 00

COWS AND HEIFERS.

Three years old and over, Biltmore Farms, Biltmore, N. C.	20 00
Second premium, H. N. Higginbotham, Joliet, Ill.	12 00
Third premium, H. N. Higginbotham, Joliet, Ill.	6 00
Two years old and under three, H. N. Higginbotham, Joliet, Ill.	15 00
Second premium, Biltmore Farms, Biltmore, N. C.	10 00
Third premium, H. N. Higginbotham, Joliet, Ill.	5 00
One year old and under two, J. E. Robbins, Greensburg, Ind.	10 00
Second premium, H. N. Higginbotham, Joliet, Ill.	7 00
Third premium, W. J. Wright, New Castle, Ind.	4 00
Calf, under one year old, Biltmore Farms, Biltmore, N. C.	7 00
Second premium, H. N. Higginbotham, Joliet, Ill.	5 00
Third premium, M. L. Hessong, Nora, Ind.	3 00
Four animals, either sex, the get of one sire, Biltmore Farms, Biltmore, N. C.	15 00
Second premium, H. N. Higginbotham, Joliet, Ill.	10 00
Third premium, W. J. Wright, New Castle, Ind.	6 00
Two animals, either sex, the produce of one cow, W. J. Wright, New Castle, Ind.	15 00
Second premium, H. N. Higginbotham, Joliet, Ill.	10 00
Third premium, Peter Raab, Brightwood, Ind.	5 00
Exhibitor's herd, H. N. Higginbotham, Joliet, Ill.	25 00
Second premium, Biltmore Farms, Biltmore, N. C.	15 00
Breeder's herd, Biltmore Farms, Biltmore, N. C.	25 00
Second premium, W. J. Wright, New Castle, Ind.	15 00

SWEEPSTAKES.

Best bull, any age, H. N. Higginbotham, Joliet, Ill.....	25 00.
Best cow or heifer, any age, Biltmore Farms, Biltmore, N. C.....	25 00

INDIANA JERSEY CATTLE CLUB—Special Premiums.

BULLS, COWS AND HEIFERS.

The following is a complete list of awards made in the Indiana Jersey Cattle Club special premiums:

Best, bull, any age—

First prize, J. E. Robbins, Greensburg, Ind., on animal named.	\$25 00.
Second prize, W. J. Wright, New Castle, Ind., on animal named.	15 00
Third prize, Peter Raab, Brightwood, Ind., on animal named...	10 00

Best cow or heifer, any age—

First prize, J. E. Robbins, Greensburg, Ind., on animal named.	25 00
Second prize, W. J. Wright, New Castle, Ind., on animal named.	15 00
Third prize, M. L. Hessong, Nora, Ind., on animal named.....	10 00

CLASS XVI—Holstein-Fresian and Dutch Belted.

BULLS.

Three years old and over, C. Easthope, Allegheny, Pa.....	\$15 00.
Second premium, W. B. Barney & Co., Hampton, Ia.....	10 00
Two years old and under three, W. B. Barney & Co., Hampton, Ia.	10 00
Second premium, C. Easthope, Allegheny, Pa.....	7 00
One year old and under two, C. Easthope, Allegheny, Pa.....	8 00
Second premium, W. B. Barney & Co., Hampton, Ia.....	6 00
Third premium, C. Easthope, Allegheny, Pa.....	3 00
Calf, under one year old, C. Easthope, Allegheny, Pa.....	5 00
Second premium, W. B. Barney & Co., Hampton, Ia.....	3 00
Third premium, W. B. Barney & Co., Hampton, Ia.....	2 00

COWS AND HEIFERS.

Three years old and over, C. Easthope, Allegheny, Pa.....	15 00
Second premium, W. B. Barney & Co., Hampton, Ia.....	10 00
Third premium, C. Easthope, Allegheny, Pa.....	4 00
Two years old and under three, C. Easthope, Allegheny, Pa.....	10 00
Second premium, C. Easthope, Allegheny, Pa.....	7 00
Third premium, W. B. Barney & Co., Hampton, Ia.....	4 00
One year old and under two, C. Easthope, Allegheny, Pa.....	8 00
Second premium, W. B. Barney & Co., Hampton, Ia.....	6 00
Third premium, W. B. Barney & Co., Hampton, Ia.....	3 00.

Calf, under one year, W. B. Barney & Co., Hampton, Ia.....	5 00
Second premium, C. Easthope, Allegheny, Pa.....	3 00
Third premium, C. Easthope, Allegheny, Pa.....	2 00
Four animals, either sex, the get of one sire, C. Easthope, Allegheny, Pa.....	10 00
Second premium, W. B. Barney & Co., Hampton, Ia.....	7 00
Third premium, C. Easthope, Allegheny, Pa.....	4 00
Two animals, either sex, the produce of one cow, W. B. Barney & Co., Hampton, Ia.....	10 00
Second premium, C. Easthope, Allegheny, Pa.....	7 00
Third premium, W. B. Barney & Co., Hampton, Ia.....	4 00
Exhibitor's herd, C. Easthope, Allegheny, Pa.....	20 00
Second premium, W. B. Barney & Co., Hampton, Ia.....	10 00
Breeder's herd, C. Easthope, Allegheny, Pa.....	20 00
Second premium, W. B. Barney & Co., Hampton, Ia.....	10 00

SWEEPSTAKES.

Best bull, any age, C. Easthope, Allegheny, Pa.....	20 00
Best cow or helper, any age, C. Easthope, Allegheny, Pa.....	20 00

CLASS XVII—Ayershires.

BULLS.

Three years old and over, J. F. Converse & Co.....	\$15 00
Second premium, J. P. Beatty, Pataskala, O.....	10 00
Third premium, Howard Cook, Beloit, O.....	5 00
Two years old and under three, J. P. Beatty, Pataskala, O.....	10 00
Second premium, Howard Cook, Beloit, O.....	7 00
Third premium, J. F. Converse & Co., Woodville, N. Y.....	4 00
One year old and under two, J. F. Converse & Co., Woodville, N. Y.....	8 00
Second premium, J. P. Beatty, Pataskala, O.....	6 00
Third premium, Howard Cook, Beloit, O.....	3 00
Calf, under one year, J. F. Converse & Co., Woodville, N. Y.....	5 00
Second premium, Howard Cook, Beloit, O.....	3 00
Third premium, J. P. Beatty, Pataskala, O.....	2 00

COWS AND HELFERS.

Three years old and over, J. F. Converse & Co., Woodville, N. Y...	15 00
Second premium, J. F. Converse & Co., Woodville, N. Y.....	10 00
Third premium, J. P. Beatty, Pataskala, O.....	5 00
Two years old and under three, Howard Cook, Beloit, O.....	10 00
Second premium, J. P. Beatty, Pataskala, O.....	7 00
Third premium, J. F. Converse & Co., Woodville, N. Y.....	4 00

One year old and under two, J. F. Converse & Co., Woodville, N. Y.	8 00
Second premium, Howard Cook, Beloit, O.	6 00
Third premium, J. P. Beatty, Pataskala, O.	3 00
Calf, under one year, Howard Cook, Beloit, O.	5 00
Second premium, J. F. Converse & Co., Woodville, N. Y.	3 00
Third premium, J. F. Converse & Co., Woodville, N. Y.	2 00
Four animals, either sex, the get of one sire, J. F. Converse & Co., Woodville, N. Y.	10 00
Second premium, J. P. Beatty, Pataskala, O.	7 00
Third premium, Howard Cook, Beloit, O.	4 00
Two animals, either sex, the produce of one cow, J. F. Converse & Co., Woodville, N. Y.	10 00
Second premium, Howard Cook, Beloit, O.	7 00
Third premium, J. P. Beatty, Pataskala, O.	4 00
Exhibitor's herd, J. F. Converse & Co., Woodville, N. Y.	20 00
Second premium, Howard Cook, Beloit, O.	10 00
Breeder's herd, J. F. Converse & Co., Woodville, N. Y.	20 00
Second premium, J. P. Beatty, Pataskala, O.	10 00

SWEEPSTAKES.

Best bull, any age, J. F. Converse & Co., Woodville, N. Y.	20 00
Best cow or heifer, any age, J. F. Converse & Co., Woodville, N. Y.	20 00

CLASS XVIII—Guernseys.

BULLS.

Three years old and over, L. V. Axtell, Painesville, O.	\$15 00
Second premium, McCormick & Edgerly, Pataskala, O.	10 00
Two years old and under three, L. V. Axtell, Painesville, O.	10 00
One year old and under two, L. V. Axtell, Painesville, O.	8 00
Second premium, McCormick & Edgerly, Pataskala, O.	6 00
Third premium, McCormick & Edgerly, Pataskala, O.	3 00
Calf, under one year, L. V. Axtell, Painesville, O.	5 00
Second premium, McCormick & Edgerly, Painesville, O.	3 00
Third premium, L. V. Axtell, Painesville, O.	2 00

COWS AND HEIFERS.

Three years old and over, L. V. Axtell, Painesville, O.	15 00
Second premium, L. V. Axtell, Painesville, O.	10 00
Third premium, McCormick & Edgerly, Pataskala, O.	5 00
Two years old and under three, L. V. Axtell, Painesville, O.	10 00
Second premium, McCormick & Edgerly, Pataskala, O.	7 00
Third premium, L. V. Axtell, Painesville, O.	4 00

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One year old and under two, McCormick & Edgerly, Pataskala, O..	8 00
Second premium, L. V. Axtell, Painesville, O.....	6 00
Third premium, L. V. Axtell, Painesville, O.....	3 00
Calf, under one year, L. V. Axtell, Painesville, O.....	5 00
Second premium, L. V. Axtell, Painesville, O.....	3 00
Third premium, McCormick & Edgerly, Pataskala, O.....	2 00
Four animals, either sex, the get of one sire, L. V. Axtell, Painesville, O.....	10 00
Second premium, McCormick & Edgerly, Pataskala, O.....	7 00
Two animals, either sex, the produce of one cow, L. V. Axtell, Painesville, O.....	10 00
Second premium, McCormick & Edgerly, Pataskala, O.....	7 00
Third premium, L. V. Axtell, Painesville, O.....	4 00
Exhibitor's herd, L. V. Axtell, Painesville, O.....	20 00
Second premium, McCormick & Edgerly, Pataskala, O.....	10 00
Breeder's herd, L. V. Axtell, Painesville, O.....	20 00
Second premium, McCormick & Edgerly, Pataskala, O.....	10 00

SWEEPSTAKES.

Best bull, any age, L. V. Axtell, Painesville, O.....	20 00
Best cow or heifer, any age, L. V. Axtell, Painesville, O.....	20 00

SPECIAL CLASS.

SHORTHORNS.

Bull calf, six months and under twelve—

First prize, Wm. N. Randall & Son, Brick Chapel, Ind., on animal named	\$40 00
Second prize, J. G. Robbins & Sons, Horace, Ind., on animal named	30 00
Third prize, J. G. Robbins & Sons, Horace, Ind., on animal named	20 00
Fourth prize, S. R. Quick & Son, Brooklyn, Ind., on animal named	15 00
Fifth prize, E. C. Thompson, Irvington, Ind., on animal named.	10 00

Bull calf, under six months—

First prize, J. G. Robbins & Sons, Horace, Ind., on animal named	30 00
Second prize, E. C. Thompson, Irvington, Ind., an animal named	20 00
Third prize, W. F. Christian, Indianapolis, Ind., on animal named	15 00
Fourth prize, W. F. Christian, Indianapolis, Ind., on animal named	10 00

Heifer calf, six months and under twelve—

First prize, J. D. Douglas & Son, Sulphur Hill, Ind., on animal named	40 00
Second prize, J. G. Robbins & Sons, Horace, Ind., on animal named	30 00
Third prize, J. D. Douglas & Sons, Sulphur Hill, Ind., on animal named	20 00
Fourth prize, Joe Witter, College Corner, O., on animal named.	15 00
Fifth prize, E. S. Folsom, Indianapolis, Ind., on animal named.	10 00
Heifer calf, under six months—	
First prize, J. D. Douglas & Son, Sulphur Hill, Ind., on animal named	30 00
Second prize, W. F. Christian, Indianapolis, Ind., on animal named	20 00
Third prize, Kinsey & Thorn, Nobelsville, Ind., on animal named	15 00
Fourth prize, J. G. Robbins & Sons, Horace, Ind., on animal named	10 00
Fifth prize, J. O. Stout, Hollandsburg, Ind., on animal named..	5 00

DEPARTMENT E.—DAIRY AND CREAMERY PRODUCTS.**CLASS XIX.**

For the best 30-pound tub of creamery butter, Perry L. Johnson,

Prairie Creek, Ind.....	\$20 00
Consolation prize divided, Perry L. Johnson, Prairie Creek, Ind....	15 00
Schlosser Bros., Hanna, Ind.....	13 30
Perry L. Johnson, Prairie Creek, Ind.....	11 50
Best 15-pound tub dairy butter, A. F. Ward, Thorntown, Ind.....	
Second premium, Peter Raab, Brightwood, Ind.....	
Third premium, Wm. J. Raab, Cumberland, Ind.....	
Consolation prize divided, Peter Raab, Brightwood, Ind.....	20 00
Wm. J. Raab, Cumberland, Ind.....	16 00
Mrs. Jerome Dunlap, Lafayette, Ind.....	4 00
Best five pounds dairy butter in one-pound prints, C. B. Benjamin, LeRoy, Ind.....	12 00
Second premium, Peter Raab, Brightwood, Ind.....	8 00
Third premium, A. F. Ward, Thorntown, Ind.....	4 00
Best five-pound dairy butter made by a girl under twenty years old, A. F. Ward, Thorntown, Ind.....	12 00

Best five-pound dairy butter made by a graduate of dairy school...	
Best full cream cheese, not less than thirty pounds, Boyd & Drischel, Cambridge City, Ind.....	15 00
Second premium, Milo A. Stocking, Dana, Ill.....	10 00
Third premium, A. E. Helman, Evans Mills, N. Y.....	5 00
Best full cream cheese, not less than thirty pounds, Indiana product, Boyd & Drischel, Cambridge City, Ind.....	15 00
Second premium, W. L. McCain, Hortonville, Ind.....	10 00
Best three Young American cream cheese, Boyd & Drischel, Cambridge City, Ind.....	8 00
Second premium, W. L. McCain, Hortonville, Ind.....	6 00
Cottage cheese, not less than one pint, A. F. Ward, Thorntown, Ind.	8 00
Second premium, Mrs. John Groseclose, Indianapolis, Ind.....	6 00
Third premium, Mrs. W. B. Flick, Lawrence, Ind.....	4 00

DEPARTMENT F.—SHEEP.

CLASS XX—Shropshires.

(John Jackson, Marlon Williams, Judges.)

RAMS.

Two years old or over, H. Calvin Williams, Abington, Pa.....	\$24 00
Second premium, G. Howard Davison, Milbrook, N. Y.....	16 00
Third premium, John Campbell, Woodville, Canada.....	10 00
One year old and under two, John Campbell, Woodville, Canada...	24 00
Second premium, Geo. Allen, Allerton, Ill.....	16 00
Third premium, H. Calvin Williams, Abington, Pa.....	10 00
Lamb, Geo. Allen, Allerton, Ill.....	24 00
Second premium, Brown Bros., Scottsville, N. Y.....	16 00
Third premium, John Campbell, Woodville, Canada.....	10 00

EWES.

Two years old or over, G. Howard Davison, Milbrook, N. Y.....	24 00
Second premium, Brown Bros., Scottsville, N. Y.....	16 00
Third premium, Geo. Allen, Allerton, Ill.....	10 00
One year old and under two, G. Howard Davison, Milbrook, N. Y..	24 00
Second premium, G. Howard Davison, Milbrook, N. Y.....	16 00
Third premium, John Campbell, Woodville, Canada.....	10 00
Lamb, Brown Bros., Scottsville, N. Y.....	24 00
Second premium, John Campbell, Woodville, Canada.....	16 00

FLOCKS.

Third premium, Brown Bros., Scottsville, N. Y.....	10 00
Aged flock, G. Howard Davison, Milbrook, N. Y.....	24 00
Second premium, Brown Bros., Scottsville, N. Y.....	16 00
Third premium, John Campbell, Woodville, Canada.....	10 00
Young flock, Brown Bros., Scottsville, N. Y.....	24 00
Second premium, G. Howard Davison, Milbrook, N. Y.....	16 00
Third premium, John Campbell, Woodville, Canada.....	10 00
Best pen five rams under two years old, Geo. Allen, Allerton, Ill...	24 00
Second premium, John Campbell, Woodville, Canada.....	16 00
Third premium, G. Howard Davison, Milbrook, N. Y.....	12 00

SWEEPSTAKES.

Best ram, any age, Folly Farm, Abington, Pa.....	24 00
Best ewe, any age, G. Howard Davison, Milbrook, N. Y.....	24 00

CLASS XXI—Oxford Down.

(W. H. Beattie, Judge, Wilton Grove, Ont.)

RAMS.

Two years old or over, Geo. McKerrow & Sons, Sussex, Wis.....	\$10 00
Second premium, Sid Conger & Son, Hope, Ind.....	6 00
Third premium, R. J. Stone, Stonington, Ill.....	4 00
One year old and under two, Geo. McKerrow & Sons, Sussex, Wis..	10 00
Second premium, Geo. McKerrow & Sons, Sussex, Wis.....	6 00
Third premium, R. J. Stone, Stonington, Ill.....	4 00
Lamb, R. J. Stone, Stonington, Ill.....	10 00
Second premium, Geo. McKerrow & Sons, Sussex, Wis.....	6 00
Third premium, R. J. Stone, Stonington, Ill.....	4 00

EWES.

Two years old or over, Geo. McKerrow & Sons, Sussex, Wis.....	10 00
Second premium, R. J. Stone, Stonington, Ill.....	6 00
Third premium, Geo. McKerrow & Sons, Sussex, Wis.....	4 00
One year old and under two, Geo. McKerrow & Sons, Sussex, Wis..	10 00
Second premium, Geo. McKerrow & Sons, Sussex, Wis.....	6 00
Third premium, Geo. McKerrow & Sons, Sussex, Wis.....	4 00
Lamb, R. J. Stone, Stonington, Ill.....	10 00
Second premium, Geo. McKerrow & Sons, Sussex, Wis.....	6 00
Third premium, Geo. McKerrow & Sons, Sussex, Wis.....	4 00

FLOCKS.

Aged flock, R. J. Stone, Stonington, Ill.	10 00
Second premium, Wilson Bros., Muncie, Ind.	6 00
Third premium, Sid Conger & Son, Hope, Ind.	2 00
Young flock, Geo. McKerrow & Sons, Sussex, Wis.	10 00
Second premium, Wilson Bros., Muncie, Ind.	6 00

SWEEPSTAKES.

Best ram, any age, Geo. McKerrow & Sons, Sussex, Wis.	10 00
Best ewe, any age, Geo. McKerrow & Sons, Sussex, Wis.	10 00

AMERICAN OXFORD DOWN RECORD ASSOCIATION—
Special Premiums.

(W. H. Beattie, Judge, Wilton Grove, Ont.)

SHEEP AND LAMBS.

The following is a complete list of awards made in the American Oxford Down Record Association special premiums:

Best yearling ram—

First prize, Sid Conger & Son, Hope, Ind., on animal named... \$10 00

Best yearling ewe—

First prize, Wilson Bros., Muncie, Ind., on animal named..... 10 00

Best pen of four lambs, either sex—

First prize, Wilson Bros., Muncie, Ind., on animals named..... 10 00

CLASS XXII—Southdown.

(John Jackson, Judge.)

RAMS.

Two years old or over, Geo. Allen, Allerton, Ill.	\$10 00
Second premium, Geo. McKerrow & Sons, Sussex, Wis.	6 00
Third premium, Watt Wilson & Son, Muncie, Ind.	4 00
One year old and under two, Geo. Allen, Allerton, Ill.	10 00
Second premium, Geo. McKerrow & Sons, Sussex, Wis.	6 00
Third premium, Geo. Allen, Allerton, Ill.	4 00
Lamb, Geo. Allen, Allerton, Ill.	10 00
Second premium, Geo. Allen, Allerton, Ill.	6 00
Third premium, Geo. McKerrow & Sons, Sussex, Wis.	4 00

FLOCKS.

Aged flock, Geo. McKerrow & Sons, Sussex, Wis.....	10 00
Second premium, Watt Wilson & Son, Muncie, Ind.....	6 00
Third premium, Sid Conger & Son, Hope, Ind.....	2 00
Young flock, Geo. McKerrow & Sons, Sussex, Wis.....	10 00
Second premium, Geo. Allen, Allerton, Ill.....	6 00
Third premium, Sid Conger & Son, Hope, Ind.....	2 00

SWEEPSTAKES.

Best ram, any age, Geo. Allen, Allerton, Ill.....	10 00
Best ewe, any age, Geo. McKerrow & Sons, Sussex, Wis.....	10 00

CLASS XXIII—Hampshire Down.

(W. H. Beattie, Judge, Wilton Grove, Ont.)

RAMS.

Two years old or over, Geo. Harding Sons, Waukesha, Wis.....	\$8 00
Second premium, John Milton, Marshall, Mich.....	4 00
One year old and under two, John Milton, Marshall, Mich.....	5 00
Second premium, Geo. Harding Sons, Waukesha, Wis.....	3 00
Lamb, Geo. Harding Sons, Waukesha, Wis.....	5 00
Second premium, Geo. Harding Sons, Waukesha, Wis.....	2 00
Third premium, John Milton, Marshall, Mich.....	2 00

EWES.

Two years old or over, John Milton, Marshall, Mich.....	8 00
Second premium, Geo. Harding Sons, Waukesha, Wis.....	4 00
Third premium, Geo. Harding Sons, Waukesha, Wis.....	2 00
One year old and under two, John Milton, Marshall, Mich.....	5 00
Second premium, Geo. Harding Sons, Waukesha, Wis.....	3 00
Third premium, Geo. Harding Sons, Waukesha, Wis.....	2 00
Lamb, John Milton, Marshall, Mich.....	5 00
Second premium, Geo. Harding Sons, Waukesha, Wis.....	2 00
Third premium, Geo. Harding Sons, Waukesha, Wis.....	2 00

FLOCKS.

Aged flock, John Milton, Marshall, Mich.....	5 00
Second premium, John Milton, Marshall, Mich.....	3 00
Young flock, John Milton, Marshall, Mich.....	5 00
Second premium, John Milton, Marshall, Mich.....	3 00

SWEEPSTAKES.

Best ram, any age, John Milton, Marshall, Mich.....	5 00
Best ewe, any age, John Milton, Marshall, Mich.....	5 00

CLASS XXIV—Cotswold.

(Marion Williams and John Jackson, Judges.)

RAMS.

Two years old or over, Geo. Harding Sons, Waukesha, Wis.....	\$10 00
Second premium, Wilson Bros., Muncie, Ind.....	6 00
Third premium, Geo. Harding Sons., Waukesha, Wis.....	4 00
One year old and under two, Geo. Harding Sons, Waukesha, Wis..	10 00
Second premium, Wilson Bros., Muncie, Ind.....	6 00
Third premium, Geo. Harding Sons, Waukesha, Wis.....	4 00
Lamb, Geo. Harding Sons, Waukesha, Wis.....	10 00
Second premium, Geo. Harding Sons, Waukesha, Wis.....	6 00
Third premium, John Rawlings, Ravenswood, Ont.....	4 00

EWES.

Two years old or over, Wilson Bros., Muncie, Ind.....	10 00
Second premium, Geo. Harding Sons, Waukesha, Wis.....	6 00
Third premium, P. Clark & Son, Cable, O.....	4 00
One year old and under two, Wilson Bros., Muncie, Ind.....	10 00
Second premium, Geo. Harding Sons, Waukesha, Wis.....	6 00
Third premium, Geo. Harding Sons, Waukesha, Wis.....	4 00
Lamb, Geo. Harding Sons, Waukesha, Wis.....	10 00
Second premium, John Rawlings, Ravenswood, Ont.....	6 00
Third premium, Wilson Bros., Muncie, Ind.....	4 00

FLOCKS.

Aged flock, J. Gibson & Son, Muncie, Ind.....	10 00
Second premium, Wilson Bros., Muncie, Ind.....	6 00
Young flock, John Rawlings, Ravenswood, Ont.....	10 00
Second premium, J. H. Woodford, Muncie, Ind.....	6 00
Third premium, J. Gibson & Son, Muncie, Ind.....	2 00

SWEEPSTAKES.

Best ram, any age, Geo. Harding Sons, Waukesha, Wis.....	10 00
Best ewe, any age, Wilson Bros., Muncie, Ind.....	10 00

AMERICAN COTSWOLD RECORD ASSOCIATION—Special Premiums.

SHEEP AND LAMBS.

The following is a complete list of the awards made in the American Cotswold Record Association special premiums:

Best flock consisting of one ram one year old or over, one ewe two years old or over, one ewe one year old and under two, and one ewe lamb—

First prize, Geo. Harding Sons, Waukesha, Wis., on animals named \$10 00

Best pen of four lambs consisting of two rams and two ewes, bred and owned by exhibitor—

First prize, Geo. Harding Sons, Waukesha, Wis., on animals named 10 00

CLASS XXV—Dorsets.

(W. H. Beattie, Wilton Grove, Ont., Judge.)

RAMS.

Two years old or over, R. Stuyvesant, Allamuchy, N. J.....	\$8 00
Second premium, R. Stuyvesant, Allamuchy, N. J.....	4 00
One year old and under two, R. Stuyvesant, Allamuchy, N. J.....	5 00
Second premium, Geo. McKerrow & Sons, Sussex, Wis.....	3 00
Third premium, Gifford & Nash, Bloomington, Ind.....	2 00
Lamb, R. Stuyvesant, Allamuchy, N. J.....	5 00
Second premium, R. Stuyvesant, Allamuchy, N. J.....	3 00
Third premium, Geo. McKerrow & Sons, Sussex, Wis.....	2 00

EWES.

Two years old or over, R. Stuyvesant, Allamuchy, N. J.....	8 00
Second premium, R. Stuyvesant, Allamuchy, N. J.....	4 00
Third premium, Geo. McKerrow & Sons, Sussex, Wis.....	2 00
One year old and under two, Geo. McKerrow & Sons, Sussex, Wis.....	5 00
Second premium, Geo. McKerrow & Sons, Sussex, Wis.....	3 00
Third premium, R. Stuyvesant, Allamuchy, N. J.....	2 00
Lamb, R. Stuyvesant, Allamuchy, N. J.....	5 00
Second premium, Geo. McKerrow & Sons, Sussex, Wis.....	3 00
Third premium, P. Clark & Son, Cable, O.....	2 00

FLOCKS.

Aged flock, R. Stuyvesant, Allamuchy, N. J.....	5 00
Young flock, R. Stuyvesant, Allamuchy, N. J.....	5 00
Second premium, Gifford & Nash, Bloomington, Ind.....	3 00

SWEEPSTAKES.

Best ram, any age, R. Stuyvesant, Allamuchy, N. J.....	5 00
Best ewe, any age, Geo. McKerrow & Sons, Sussex, Wis.....	5 00

CLASS XXVI—Rambouillet.

(Uriah Privett, Judge, Greensburg, Ind.)

RAMS.

Two years old or over, Geo. Harding Sons, Waukesha, Wis.....	\$8 00
Second premium, Lincoln Bros., Milford Center, O.....	4 00
Third premium, Geo. Harding Sons, Waukesha, Wis.....	2 00
One year old or under two, Max Chapman, New California, O....	5 00
Second premium, Geo. Harding Sons, Waukesha, Wis.....	3 00
Third premium, Lincoln Bros., Milford Center, O.....	2 00
Lamb, Geo. Harding Sons, Waukesha, Wis.....	5 00
Second premium, Max Chapman, New California, O.....	2 00

EWES.

Two years old or over, Lincoln Bros., Milford Center, O.....	8 00
Second premium, Lincoln Bros., Milford Center, O.....	4 00
Third premium, Max Chapman, New California, O.....	2 00
One year old and under two, Max Chapman, New California, O....	5 00
Second premium, Max Chapman, New California, O.....	3 00
Third premium, Geo. Harding Sons, Waukesha, Wis.....	2 00
Lamb, Max Chapman, New California, O.....	5 00
Second premium, Geo. Harding Sons, Waukesha, Wis.....	3 00
Third premium, Geo. Harding Sons, Waukesha, Wis.....	2 00

FLOCKS.

Aged flock, Max Chapman, New California, O.....	5 00
Second premium, Lincoln Bros., Milford Center, O.....	3 00
Young flock, Max Chapman, New California, O.....	5 00
Second premium, Lincoln Bros., Milford Center, O.....	3 00

SWEEPSTAKES.

Best ram, any age, Geo. Harding Sons, Waukesha, Wis.....	5 00
Best ewe, any age, Max Chapman, New California, O.....	5 00

CLASS XXVII—Fine Wool, American Merino.

(Uriah Privett, Judge, Greensburg, Ind.)

RAMS.

Two years old or over, J. M. Flanagan, Niles, O.....	\$8 00
Second premium, Uriah Cook & Sons, W. Mansfield, O.....	4 00
Third premium, Uriah Cook & Sons, W. Mansfield, O.....	2 00
One year old and under two, C. H. Bell, Ashley, O.....	5 00
Second premium, R. D. Williamson, Xenia, O.....	3 00
Third premium, C. H. Bell, Ashley, O.....	2 00
Lamb, C. H. Bell, Ashley, O.....	5 00
Second premium, C. H. Bell, Ashley, O.....	3 00
Third premium, C. H. Bell, Ashley, O.....	2 00

EWES.

Two years old or over, R. D. Williamson, Xenia, O.....	8 00
Second premium, Uriah Cook & Sons, W. Mansfield, O.....	4 00
Third premium, R. D. Williamson, Xenia, O.....	2 00
One year old and under two, C. H. Bell, Ashley, O.....	5 00
Second premium, H. E. Moore, N. Farmington, Mich.....	3 00
Third premium, Uriah Cook & Sons, W. Mansfield, O.....	2 00
Lamb, R. D. Williamson, Xenia, O.....	5 00
Second premium, C. H. Bell, Ashley, O.....	3 00
Third premium, H. E. Moore, N. Farmington, Mich.....	2 00

FLOCKS.

Aged flock, R. D. Williamson, Xenia, O.....	5 00
Second premium, C. H. Bell, Ashley, O.....	3 00
Third premium, Uriah Cook & Sons, W. Mansfield, O.....	2 00
Young flock, C. H. Bell, Ashley, O.....	5 00
Second premium, R. D. Williamson, Xenia, O.....	3 00
Third premium, Uriah Cook & Sons, W. Mansfield, O.....	2 00

SWEEPSTAKES.

Best ram, any age, J. M. Flanagan, Niles, O.....	5 00
Best ewe, any age, C. H. Bell, Ashley, O.....	5 00

CLASS XXVIII—Delaine Merinos.

(Uriah Privett, Judge, Greensburg, Ind.)

RAMS.

Two years old or over, R. D. Williamson, Xenia, O.....	\$8 00
Second premium, C. H. Bell, Ashley, O.....	3 00
Third premium, C. H. Williams, Church, Mich.....	2 00
One year old and under two, C. H. Williams, Church, Mich.....	5 00
Second premium, J. M. Flanagan, Niles, O.....	3 00
Third premium, Uriah Cook & Sons, W. Mansfield, O.....	2 00
Lamb, C. H. Williams, Church, Mich.....	5 00
Second premium, C. H. Bell, Ashley, O.....	3 00
Third premium, C. H. Bell, Ashley, O.....	2 00

EWES.

Two years old or over, C. H. Williams, Church, Mich.....	8 00
Second premium, Uriah Cook & Sons, W. Mansfield, O.....	4 00
Third premium, R. D. Williamson, Xenia, O.....	2 00
One year old and under two, J. M. Flanagan, Niles, O.....	5 00
Second premium, R. D. Williamson, Xenia, O.....	3 00
Third premium, C. H. Williams, Church, Mich.....	2 00
Lamb, C. H. Williams, Church, Mich.....	5 00
Second premium, C. H. Bell, Ashley, O.....	3 00
Third premium, R. D. Williamson, Xenia, O.....	2 00

FLOCKS.

Aged flock, C. H. Williams, Church, Mich.....	5 00
Second premium, R. D. Williamson, Xenia, O.....	3 00
Third premium, J. M. Flanagan, Niles, O.....	2 00
Young flock, C. H. Bell, Ashley, O.....	5 00
Second premium, J. M. Flanagan, Niles, O.....	3 00
Third premium, C. H. Williams, Church, Mich.....	2 00

SWEEPSTAKES.

Best ram, any age, C. H. Williams, Church, Mich.....	5 00
Best ewe, any age, C. H. Williams, Church, Mich.....	5 00

CLASS XXIX—Cheviot.

(W. H. Beattie, Judge, Wilton Grove, Ont.)

RAMS.

Two years old or over, Crodian & Hartman, Fincastle, Ind.....	\$8 00
Second premium, Crodian & Hartman, Fincastle, Ind.....	4 00
Third premium, Sigler & Vermillion, Clinton Falls, Ind.....	2 00
One year old and under two, Crodian & Hartman, Fincastle, Ind...	5 00
Second premium, Crodian & Hartman, Fincastle, Ind.....	3 00
Third premium, Sigler & Vermillion, Clinton Falls, Ind.....	2 00
Lamb, Crodian & Hartman, Fincastle, Ind.....	5 00
Second premium, Crodian & Hartman, Fincastle, Ind.....	3 00
Third premium, Sigler & Vermillion, Clinton Falls, Ind.....	2 00

EWES.

Two years old or over, Crodian & Hartman, Fincastle, ind.....	8 00
Second premium, Sigler & Vermillion, Clinton Falls, Ind.....	4 00
Third premium, Crodian & Hartman, Fincastle, Ind.....	2 00
One year old and under two, Crodian & Hartman, Fincastle, Ind..	5 00
Second premium, Sigler & Vermillion, Clinton Falls, Ind.....	3 00
Third premium, Sigler & Vermillion, Clinton Falls, Ind.....	2 00
Lamb, Crodian & Hartman, Fincastle, Ind.....	5 00
Second premium, Crodian & Hartman, Fincastle, Ind.....	3 00
Third premium, Sigler & Vermillion, Clinton Falls, Ind.....	2 00

FLOCKS.

Aged flock, Crodian & Hartman, Fincastle, Ind.....	5 00
Second premium, Sigler & Vermillion, Clinton Falls, Ind.....	3 00
Third premium, Crodian & Hartman, Fincastle, Ind.....	2 00
Young flock, Crodian & Hartman, Fincastle, Ind.....	5 00
Second premium, Sigler & Vermillion, Clinton Falls, Ind.....	3 00
Third premium, Crodian & Hartman, Fincastle, Ind.....	2 00

SWEEPSTAKES.

Best ram, any age, Crodian & Hartman, Fincastle, Ind.....	5 00
Best ewe, any age, Crodian & Hartman, Fincastle, Ind.....	5 00

DEPARTMENT G.—SWINE.

CLASS XXX—Berkshire.

(W. R. Harvey, Judge, Libey, Ill.)

BOARS.

Two years old and over, Biltmore Farms, Biltmore, N. C.....	\$12 00
Second premium, John F. Stover, Crawfordsville, Ind.....	8 00
Third premium, Biltmore Farms, Biltmore, N. C.....	4 00
One year old and under two, Karl B. Clough, N. Amherst, O.....	10 00
Second premium, Geo. W. Jessup, Rockville, Ind.....	7 00
Third premium, Geo. W. Jessup, Rockville, Ind.....	3 00
Six months and under twelve, Biltmore Farms, Biltmore, N. C....	8 00
Second premium, A. W. Porter, Maywood, Ind.....	5 00
Third premium, A. W. Porter, Maywood, Ind.....	2 00
Under six months, I. N. Barker & Son, Thorntown, Ind.....	8 00
Second premium, I. N. Barker & Son, Thorntown, Ind.....	5 00
Third premium, Karl B. Clough, North Amhurst, O.....	2 00

SOWS.

Two years old or over, John F. Stover, Crawfordsville, Ind.....	12 00
Second premium, John F. Stover, Crawfordsville, Ind.....	8 00
Third premium, Biltmore Farms, Biltmore, N. C.....	4 00
One year old and under two, Biltmore Farms, Biltmore, N. C....	10 00
Second premium, Biltmore Farms, Biltmore, N. C.....	7 00
Third premium, Karl B. Clough, N. Amhurst, O.....	3 00
Six months and under twelve, Biltmore Farms, Biltmore, N. C....	8 00
Second premium, Biltmore Farms, Biltmore, N. C.....	5 00
Third premium, John F. Stover, Crawfordsville, Ind.....	2 00
Under six months, I. N. Barker & Son, Thorntown, Ind.....	8 00
Second premium, I. N. Barker & Son, Thorntown, Ind.....	5 00
Third premium, I. N. Barker & Son, Thorntown, Ind.....	2 00

HERDS.

Boar and three sows over 1 year, Biltmore Farms, Biltmore, N. C.	20 00
Second premium, John F. Stover, Crawfordsville, Ind.....	10 00
Boar and three sows under 1 year, Biltmore Farms, Biltmore, N. C.	15 00
Second premium, I. N. Barker & Son, Thorntown, Ind.....	10 00
Five pigs under one year, the get of one boar or produce of one sow, I. N. Barker & Son, Thorntown, Ind.....	12 00

Second premium, I. N. Barker & Son, Thorntown, Ind.....	8 00
Five pigs under six months, I. N. Barker & Son, Thorntown, Ind..	12 00
Second premium, I. N. Barker & Son, Thorntown, Ind.....	8 00
Pair pigs under one year, Biltmore Farms, Biltmore, N. C.....	12 00
Second premium, I. N. Barker & Son, Thorntown, Ind.....	8 00

SWEEPSTAKES.

Boar, any age, Karl B. Clough, N. Amburst, O.....	20 00
Sow, any age, Biltmore Farms, Biltmore, N. C.....	20 00

CLASS XXXI—Poland China.

(J. M. Klever, Judge, Bloomington, O.)

BOARS.

Two years old or over, Lindley & Butler, Russiaville, Ind.....	\$12 00
Second premium	
One year old and under two, Mints Bros., Mohawk, Ind.....	10 00
Second premium, Lucian Arbuckle, Hope, Ind.....	7 00
Third premium, W. A. Smiley, Milligan, Ind.....	3 00
Six months old and under twelve, W. F. Kerlin, Rockfield, Ind....	10 00
Second premium, Adam F. May, Flatrock, Ind.....	5 00
Third premium, F. Gartin & Sons, Burney, Ind.....	2 00
Under six months, W. F. Kerlin, Rockfield, Ind.....	8 00
Second premium, W. A. Smiley, Milligan, Ind.....	5 00
Third premium, W. C. Williams & Co., Knightstown, Ind.....	2 00

SOWS.

Two years old or over, W. A. Smiley, Milligan, Ind.....	12 00
Second premium, Lindley & Butler, Russiaville, Ind.....	8 00
One year old and under two, John G. Allen, Millville, Ind.....	10 00
Second premium, W. A. Smiley, Milligan, Ind.....	7 00
Third premium, W. A. Smiley, Milligan, Ind.....	3 00
Six months and under twelve, F. Gartin & Sons, Burney, Ind.....	8 00
Second premium, Lucian Arbuckle, Hope, Ind.....	5 00
Third premium, W. A. Smiley, Milligan, Ind.....	2 00
Under six months, W. C. Williams & Co., Knightstown, Ind.....	8 00
Second premium, F. Gartin & Sons, Burney, Ind.....	5 00
Third premium, Adam F. May, Flatrock, Ind.....	2 00

HERDS.

Boar and three sows over one year, W. A. Smiley, Milligan, Ind...	20 00
Second premium, Lindley & Butler, Russiaville, Ind.....	10 00
Boar and three sows under one year, F. Gartin & Sons, Burney, Ind	15 00
Second premium, W. A. Smiley, Milligan, Ind.....	10 00
Five pigs under one year, the get of one boar or produce of one sow, F. Gartin & Sons, Burney, Ind.....	12 00
Second premium, F. Gartin & Sons, Burney, Ind.....	8 00
Five pigs under six months, W. C. Williams & Co. Knightstown, Ind	12 00
Second premium, F. Gartin & Sons, Burney, Ind.....	8 00
Pair pigs under one year, F. Gartin & Sons, Burney, Ind.....	12 00
Second premium, W. C. Williams & Co., Knightstown, Ind.....	8 00

SWEEPSTAKES.

Boar, any age, Mints Bros., Mohawk, Ind.....	20 00
Sow, any age, John G. Allen, Millville, Ind.....	20 00

CLASS XXXII—Chester White, Victoria, Chester and Large Yorkshire.

(Ott Utter, Judge, Columbia, Ind.)

BOARS.

Two years old or over, F. P. & J. J. Hardin, Lima, O.....	\$12 00
Second premium, Dorsey Bros., Perry, Ill.....	8 00
Third premium, Davis Bros., Dyer, Ind.....	4 00
One year old and under two, F. P. & J. J. Hardin, Lima, O.....	10 00
Second premium, J. Gibson & Son, Muncie, Ind.....	7 00
Third premium, Dorsey Bros., Perry, Ill.....	3 00
Six months and under twelve, F. P. & J. J. Hardin, Lima, O.....	8 00
Second premium, F. P. & J. J. Hardin, Lima, O.....	5 00
Third premium, J. Gibson & Son, Muncie, Ind.....	2 00
Under six months, W. W. Milner & Son, Thorntown, Ind.....	8 00
Second premium, R. S. Russell, Nora, Ind.....	5 00
Davis Bros., Dyer, Ind.....	4 00

SOWS.

Two years old and over, Warren W. Trout, Greenwood, Ind.....	12 00
Second premium, H. P. Wood & Bro., Whiteland, Ind.....	8 00
Third premium, Dorsey Bros., Perry, Ill.....	4 00
One year old and under two, Davis Bros., Dyer, Ind.....	10 00

Second premium, Dorsey Bros., Perry, Ill.....	7 00
Third premium, F. P. & J. J. Hardin, Lima, O.....	2 00
Six months and under twelve, Davis Bros., Dyer, Ind.....	8 00
Second premium, J. Gibson & Son, Muncie, Ind.....	5 00
Third premium, H. P. Wood & Bro., Whiteland, Ind.....	2 00
Under six months, F. P. & J. J. Hardin, Lima, O.....	8 00
Second premium, W. W. Milner & Son, Thorntown, Ind.....	5 00
Third premium, W. W. Milner & Son, Thorntown, Ind.....	2 00

HERDS.

Boar and three sows over one year, F. P. & J. J. Hardin, Lima, Ohio	20 00
Second premium, Dorsey Bros., Perry, Ill.....	10 00
Boar and three sows under one year, F. P. & J. J. Hardin, Lima, Ohio	15 00
Second premium, Davis Bros., Dyer, Ind.....	10 00
Five pigs under one year, the get of one boar or produce of one sow, F. P. & J. J. Hardin, Lima, O.....	21 00
Second premium, Davis Bros., Dyer, Ind.....	8 00
Five pigs under six months, Davis Bros., Dyer, Ind.....	12 00
Second premium, W. W. Milner & Son, Thorntown, Ind.....	8 00
Pair pigs under one year, F. P. & J. J. Hardin, Lima, Ohio.....	12 00
Second premium, Davis Bros., Dyer, Ind.....	8 00

SWEEPSTAKES.

Boar, any age, F. P. & J. J. Hardin, Lima, O.....	20 00
Sow, any age, Warren W. Trout, Greenwood, Ind.....	20 00

CLASS XXXIII—Duroc, Jersey, Tamworth and Thin Rind.

(W. R. Harvey, Judge, Libey, Ill.)

BOARS.

Two years old or over, O. Walter & Co., Lebanon, O.....	\$12 00
Second premium, G. W. Trone & Sons, Rushville, Ill.....	8 00
Third premium, Brown, Moorman & Co., Winchester, Ind.....	4 00
One year old and under two, G. W. Trone & Sons, Rushville, Ill....	10 00
Second premium, Brown, Moorman & Co., Winchester, Ind.....	7 00
Third premium, O. Walter & Co., Lebanon, O.....	3 00
Six months and under twelve, G. W. Trone & Sons, Rushville, Ill.,	8 00
Second premium, O. Walter & Co., Lebanon, O.....	5 00
Third premium, C. P. Van Doren, Sulphur Hill, Ill.....	2 00
Under six months, O. Walter & Co., Lebanon, O.....	8 00
Second premium, Brown, Moorman & Co., Winchester, Ind.....	5 00
Third premium, Brown, Moorman & Co., Winchester, Ind.....	2 00

SOWS.

Two years old or over, G. W. Trone & Sons, Rushville, Ill.	12 00
Second premium, O. Walter & Co., Lebanon, O.	8 00
Third premium, G. W. Trone & Sons, Rushville, Ill.	4 00
One year old and under two, O. Walter & Co., Lebanon, O.	10 00
Second premium, O. Walter & Co., Lebanon, O.	7 00
Third premium, O. Walter & Co., Lebanon, O.	3 00
Six months and under twelve, O. Walter & Co.	8 00
Second premium, O. Walter & Co., Lebanon, O.	5 00
Third premium, O. Walter & Co., Lebanon, O.	2 00
Under six months, O. Walter & Co., Lebanon, O.	8 00
Second premium, O. Walter & Co., Lebanon, O.	5 00
Third premium, Brown, Moorman & Co., Winchester, Ind.	2 00

HERDS.

Boar and three sows over one year, O. Walter & Co., Lebanon, O.	15 00
Second premium, G. W. Trone & Sons, Rushville, Ill.	10 00
Boar and three sows under one year, O. Walter & Co., Lebanon, O.	15 00
Second premium, G. W. Trone & Sons, Rushville, Ill.	10 00
Five pigs under one year, the get of one boar or produce of one sow, O. Walter & Co., Lebanon, O.	12 00
Second premium, O. Walter & Co., Lebanon, O.	8 00
Five pigs under six months, O. Walter & Co., Lebanon, O.	8 00
Pair pigs under one year, G. W. Trone & Son, Rushville, Ill.	12 00
Second premium, O. Walter & Co., Lebanon, O.	8 00

SWEEPSTAKES.

Boar, any age, G. W. Trone & Co., Lebanon, O.	20 00
Sow, any age, O. Walter & Co., Lebanon, O.	20 00

CLASS XXXIV—Essex and Suffolk.

(Ott Utter, Judge, Columbia, Ind.)

BOARS.

Two years old or over, Stolz Bros., Westchester, Ind.	\$5 00
Second premium, A. C. Green & Sons, Winchester, Ind.	3 00
One year old and under two, Stolz Bros., Westchester, Ind.	4 00
Second premium, A. C. Green & Sons, Winchester, Ind.	2 00
Six months and under twelve, A. C. Green & Sons, Winchester, Ind.	3 00
Second premium, Stolz Bros., Westchester, Ind.	2 00
Under six months, Stolz Bros., Westchester, Ind.	3 00
Second premium, A. C. Green & Sons, Winchester, Ind.	2 00

SOWS.

Two years old or over, A. C. Green & Sons, Winchester, Ind.....	5 00
Second premium, Stolz Bros., Westchester, Ind.....	3 00
One year old and under two, Stolz Bros., Westchester, Ind.....	4 00
Second premium, A. C. Green & Sons, Winchester, Ind.....	2 00
Six months and under twelve, Stolz Bros., Westchester, Ind.....	3 00
Second premium, A. C. Green & Sons, Winchester, Ind.....	2 00
Under six months, Stolz Bros., Westchester, Ind.....	3 00
Second premium, A. C. Green & Sons, Winchester, Ind.....	2 00

HERDS.

Boar and three sows over one year, Stolz Bros., Westchester, Ind..	7 00
Second premium, A. C. Green & Sons, Winchester, Ind.....	4 00
Boar and three sows under one year, A. C. Green & Sons, Winchester, Ind	5 00
Second premium, Stolz Bros., Westchester, Ind.....	3 00
Five pigs under one year, the get of one boar or produce of one sow.	
Five pigs under six months, Stolz Bros., Westchester, Ind.....	4 00
Second premium, A. C. Green & Sons, Winchester, Ind.....	2 00
Pair pigs under one year, A. C. Green & Sons, Winchester, Ind....	4 00
Second premium, Stolz Bros., Westchester, Ind.....	2 00

SWEEPSTAKES.

Boar, any age, Stolz Bros., Westchester, Ind.....	7 50
Sow, any age, Stolz Bros., Westchester, Ind.....	7 50

CLASS XXXV—Small Yorkshire.

(Ott Utter, Judge, Columbia, Ind.)

BOARS.

Two years old or over, Bascom & McMurray, California, Mich....	\$5 00
Second premium, Bascom & McMurray, California, Mich.....	3 00
One year old and under two, Bascom & McMurray, California, Mich.	4 00
Six months and under twelve, Bascom & McMurray, California, Mich	3 00
Second premium, Bascom & McMurray, California, Mich.....	2 00
Under six months, Bascom & McMurray, California, Mich.....	3 00
Second premium, Bascom & McMurray, California, Mich.....	2 00

SOWS.

Two years old or over, Bascom & McMurray, California, Mich....	5 00
Second premium, Bascom & McMurray, California, Mich	3 00
One year old and under two, Bascom & McMurray, California, Mich	4 00
Second premium, Bascom & McMurray, California, Mich	2 00
Six months and under twelve, Bascom & McMurray, California, Mich	3 00
Second premium, Bascom & McMurray, California, Mich	2 00
Under six months, Bascom & McMurray, California, Mich	3 00
Second premium, Bascom & McMurray, California, Mich	2 00

HERDS.

Boar and three sows over one year, Bascom & McMurray, California, Mich	7 00
Second premium, A. C. Green & Sons, Winchester, Ind.	4 00
Boar and three sows under one year, Bascom & McMurray, California, Mich	5 00
Second premium, Bascom & McMurray, California, Mich	3 00
Five pigs under one year, the get of one boar or produce of one sow	
Five pigs under six months, Bascom & McMurray, California, Mich	4 00
Second premium, Bascom & McMurray, California, Mich	2 00
Pair pigs under one year, Bascom & McMurray, California, Mich ..	4 00
Second premium, Bascom & McMurray, California, Mich	2 00

SWEEPSTAKES.

Boar, any age, Bascom & McMurray, California, Mich	7 50
Boar, any age, Bascom & McMurray, California, Mich	7 50

DEPARTMENT H.—POULTRY.

CLASS I—Asiatics.

(B. W. Pierce, Judge, Indianapolis, Ind.)

Light Brahma cock, J. P. Painter, Middletown, Ind.	\$3 00
Second premium, Frank P. Johnson, Howland, Ind.	2 00
Third premium, N. E. Woods, Pecksburg, Ind.	Ribbon

Light Brahma hen, N. E. Woods, Pecksburg, Ind.....	3 00
Second premium, N. E. Woods, Pecksburg, Ind.....	2 00
Third premium, N. E. Woods, Pecksburg, Ind.....	Ribbon
Light Brahma cockerel, J. C. Fishel & Son, Hope, Ind.....	3 00
Second premium, J. C. Fishel & Son, Hope, Ind.....	2 00
Third premium, N. E. Woods, Pecksburg, Ind.....	Ribbon
Light Brahma pullet, J. C. Fishel & Son, Hope, Ind.....	3 00
Second premium, J. C. Fishel & Son, Hope, Ind.....	2 00
Third premium, N. E. Woods, Pecksburg, Ind.....	Ribbon
Light Brahma breeding pen, J. D. Fishel & Son, Hope, Ind.....	8 00
Second premium, N. E. Woods, Pecksburg, Ind.....	4 00
Third, J. P. Painter, Middletown, Ind.....	Ribbon
Dark Brahma cock, C. E. & W. Smith, Ashley, O.....	1 50
Second premium, John Evans, Greenfield, Ind.....	50
Third premium, John Evans, Greenfield, Ind.....	Ribbon
Dark Brahma hen, C. E. & W. Smith, Ashley, O.....	1 50
Second premium, John Evans, Greenfield, Ind.....	50
Dark Brahma cock, C. E. & W. Smith, Ashley, O.....	Ribbon
Dark Brahma cockerel, C. E. & W. Smith, Ashley, O.....	1 50
Second premium, T. N. Smiley & Son, Milligan, Ind.....	50
Third premium, T. H. Buck, Morristown, Ind.....	Ribbon
Dark Brahma pullet, C. E. & W. Smith, Ashley, O.....	1 50
Second premium, C. E. & W. Smith, Ashley, O.....	50
Third premium, C. E. & W. Smith, Ashley, O.....	Ribbon
Dark Brahma breeding pen, C. E. & W. Smith, Ashley, O.....	4 00
Second premium, John Evans, Greenfield, Ind.....	2 00
Third premium, T. N. Smiley & Son, Milligan, Ind.....	Ribbon
Buff Cochín cock, Warbritton Bros., Ladoga, Ind.....	3 00
Second premium, A. S. Gilmore, Greensburg, Ind.....	2 00
Third premium, J. J. Van Winkle, Mechanicsburg, Ind.....	Ribbon
Buff Cochín hen, Warbritton Bros., Ladoga, Ind.....	3 00
Second premium, A. S. Gilmore, Greensburg, Ind.....	2 00
Third premium, J. J. Van Winkle, Mechanicsburg, Ind.....	Ribbon
Buff Cochín cockerel, R. E. Jones, Flatrock, Ind.....	3 00
Second premium, J. J. Van Winkle, Mechanicsburg, Ind.....	2 00
Third premium, J. J. Van Winkle, Mechanicsburg, Ind.....	Ribbon
Buff Cochín pullet, J. J. Van Winkle, Mechanicsburg, Ind.....	3 00
Second premium, J. J. Van Winkle, Mechanicsburg, Ind.....	2 00
Third premium, R. E. Jones, Flatrock, Ind.....	Ribbon
Buff Cochín breeding pen, Warbritton Bros., Ladoga, Ind.....	6 00
Second premium, J. J. Van Winkle, Mechanicsburg, Ind.....	3 00
Third premium, Will A. Graffis, Logansport, Ind.....	Ribbon
White Cochín cock, Warbritton Bros., Ladoga, Ind.....	1 50
Second premium, W. O. Swain, Manilla, Ind.....	50
Third premium, W. O. Swain, Manilla, Ind.....	Ribbon

White Cochlin hen, Warbritton Bros., Ladoga, Ind.....	1 50
Second premium, Warbritton Bros., Ladoga, Ind.....	50
Third premium, Warbritton Bros., Ladoga, Ind.....	Ribbon
White Cochlin cockerel, Warbritton Bros., Ladoga, Ind.....	1 50
Second premium, W. O. Swain, Manilla, Ind.....	50
Third premium, Warbritton Bros., Ladoga, Ind.....	Ribbon
White Cochlin pullet, T. N. Smiley & Son, Milligan, Ind.....	1 50
Second premium, T. N. Smiley & Son, Milligan, Ind.....	50
Third premium, Warbritton Bros., Ladoga, Ind.....	Ribbon
White Cochlin breeding pen, Warbritton Bros., Ladoga, Ind.....	3 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	2 00
Third premium, Warbritton Bros., Ladoga, Ind.....	Ribbon
Black Cochlin cock, B. F. Hill, Indianapolis, Ind.....	2 00
Second premium, Mrs. R. W. Williams, Indianapolis, Ind.....	1 00
Third premium, Warbritton Bros., Ladoga, Ind.....	Ribbon
Black Cochlin hen, Warbritton Bros., Ladoga, Ind.....	2 00
Second premium, B. F. Hill, Indianapolis, Ind.....	1 00
Third premium, T. H. Buck, Morristown, Ind.....	Ribbon
Black Cochlin cockerel, B. F. Hill, Indianapolis, Ind.....	2 00
Second premium, Mrs. R. W. Williams, Indianapolis, Ind.....	1 00
Third premium, Louis Seidensticker & Son, Brightwood, Ind.....	Ribbon
Black Cochlin pullet, Mrs. R. W. Williams, Indianapolis, Ind.....	2 00
Second premium, B. F. Hill, Indianapolis, Ind.....	1 00
Third premium, Louis Seidensticker & Son, Brightwood, Ind.....	Ribbon
Black Cochlin breeding pen, B. F. Hill, Indianapolis, Ind.....	4 00
Second premium, Warbritton Bros., Ladoga, Ind.....	2 00
Third premium, Louis Seidensticker & Son, Brightwood, Ind.....	Ribbon
Partridge Cochlin cock, S. A. Nofztger, N. Manchester, Ind.....	2 50
Second premium, John Evans, Greenfield, Ind.....	1 50
Third premium, S. A. Nofztger, N. Manchester, Ind.....	Ribbon
Partridge Cochlin hen, S. A. Nofztger, N. Manchester, Ind.....	2 50
Second premium, S. A. Nofztger, N. Manchester, Ind.....	1 50
Third premium, C. E. & W. Smith, Ashley, O.....	Ribbon
Partridge Cochlin cockerel, C. E. & W. Smith, Ashley, O.....	2 50
Second premium, S. A. Nofztger, N. Manchester, Ind.....	1 50
Third premium, T. A. Dean, Perkinsville, Ind.....	Ribbon
Partridge Cochlin pullet, C. E. & W. Smith, Ashley, O.....	2 50
Second premium, S. A. Nofztger, N. Manchester, Ind.....	1 50
Third premium, S. A. Nofztger, N. Manchester, Ind.....	Ribbon
Partridge Cochlin breeding pen, S. A. Nofztger, N. Manchester, Ind.....	5 00
Second premium, C. E. & W. Smith, Ashley, O.....	3 00
Third premium, T. A. Dean, Perkinsville, Ind.....	Ribbon
Black Langshan cock, Ben. S. Myers, Crawfordsville, Ind.....	3 00
Second premium, Ben. S. Myers, Crawfordsville, Ind.....	2 00
Third premium, Ben. S. Myers, Crawfordsville, Ind.....	Ribbon

Black Langshan hen, Ben. S. Myers, Crawfordsville, Ind.....	3 00
Second premium, Ben. S. Myers, Crawfordsville, Ind.....	2 00
Third premium, Ben. S. Myers, Crawfordsville, Ind.....	Ribbon
Black Langshan cockerel, Ben. S. Myers, Crawfordsville, Ind.....	3 00
Second premium, Ben. S. Myers, Crawfordsville, Ind.....	2 00
Black Langshan pullet, Ben. S. Myers, Crawfordsville, Ind.....	3 00
Second premium, Ben. S. Myers, Crawfordsville, Ind.....	2 00
Third premium, Ben. S. Myers, Crawfordsville, Ind.....	Ribbon
Black Langshan breeding pen, Ben. S. Myers, Crawfordsville, Ind..	8 00
Second premium, Ben. S. Myers, Crawfordsville, Ind.....	4 00
White Langshan cock, T. N. Smiley & Son, Milligan, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
White Langshan hen, T. N. Smiley & Son, Milligan, Ind.....	1 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	50
Third premium, T. H. Buck, Morristown, Ind.....	Ribbon
White Langshan cockerel, T. N. Smiley & Son, Milligan, Ind.....	1 00
Second premium, no premium awarded.	
White Langshan pullet, T. N. Smiley & Son, Milligan, Ind.....	1 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	50
Third premium, T. N. Smiley & Son, Milligan, Ind.....	Ribbon

AMERICAN.

Barred Plymouth Rock cock, Mrs. R. W. Williams, Indianapolis, Ind	3 00
Second premium, Geo. Muck, Edinburg, Ind.....	2 00
Third premium, Ed. B. Murphy, Carmel, Ind.....	Ribbon
Barred Plymouth Rock hen, Geo. Muck, Edinburg, Ind.....	3 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	2 00
Third premium, Ed. B. Murphy, Carmel, Ind.....	Ribbon
Barred Plymouth Rock cockerel, Ed. B. Murphy, Carmel, Ind.....	3 00
Second premium, Geo. Muck, Edinburg, Ind.....	2 00
Third premium, Willard Winn, Lucerne, Ind.....	Ribbon
Barred Plymouth Rock pullet, Ed. B. Murphy, Carmel, Ind.....	3 00
Second premium, Geo. Muck, Edinburg, Ind.....	2 00
Third premium, Ed. B. Murphy, Carmel, Ind.....	Ribbon
Barred Plymouth Rock breeding pen, Ed. B. Murphy, Carmel, Ind.	8 00
Second premium, Geo. Muck, Edinburg, Ind.....	4 00
Third premium, Willard Winn, Lucerne, Ind.....	Ribbon
White Plymouth Rock cock, Warbritton Bros., Ladoga, Ind.....	3 00
Second premium, R. E. Jones, Flatrock, Ind.....	2 00
Third premium, W. O. Swain, Manilla, Ind.....	Ribbon
White Plymouth Rock hen, Wm. Grose, Middletown, Ind.....	3 00
Second premium, Wm. Grose, Middletown, Ind.....	2 00
Second premium, W. O. Swain, Manilla, Ind.....	Ribbon

White Plymouth Rock cockerel, Ed. B. Murphy, Carmel, Ind.....	3 00
Second premium, R. E. Jones, Flatrock, Ind.....	2 00
Third premium, Wesley Lanus, Greensburg, Ind.....	Ribbon
White Plymouth Rock pullet, R. E. Jones, Flatrock, Ind.....	3 00
Second premium, C. E. & W. Smith, Ashley, O.....	2 00
Third premium, R. E. Jones, Flatrock, Ind.....	Ribbon
White Plymouth Rock breeding pen.....	
Buff Plymouth Rock cock, A. L. Weckler, Bunker Hill, Ind.....	3 00
Second premium, S. A. Nofztger, North Manchester, Ind.....	2 00
Third premium, A. L. Weckler, Bunker Hill, Ind.....	Ribbon
Buff Plymouth Rock hen, W. C. Pierce & Co., Indianapolis, Ind....	3 00
Second premium, A. L. Weckler, Bunker Hill, Ind.....	2 00
Third premium, S. A. Nofztger, North Manchester, Ind.....	Ribbon
Buff Plymouth Rock cockerel, A. L. Weckler, Bunker Hill, Ind....	3 00
Second premium, S. A. Nofztger, North Manchester, Ind.....	2 00
Third premium, A. L. Weckler, Bunker Hill, Ind.....	Ribbon
Buff Plymouth Rock pullet, R. E. Jones, Flatrock, Ind.....	3 00
Second premium, A. L. Weckler, Bunker Hill, Ind.....	2 00
Third premium, A. L. Weckler, Bunker Hill, Ind.....	Ribbon
Buff Plymouth Rock breeding pen.....	
Buff Wyandotte cock, W. C. Pierce & Co., Indianapolis, Ind.....	2 00
Second premium, W. C. Pierce & Co., Indianapolis, Ind.....	1 50
Third premium, W. C. Pierce & Co., Indianapolis, Ind.....	Ribbon
Buff Wyandotte hen, W. C. Pierce & Co., Indianapolis, Ind.....	2 00
Second premium, W. C. Pierce & Co., Indianapolis, Ind.....	1 50
Third premium, W. C. Pierce & Co., Indianapolis, Ind.....	Ribbon
Buff Wyandotte cockerel, W. C. Pierce & Co., Indianapolis, Ind....	2 00
Second premium, S. B. Lane, Spiceland, Ind.....	1 50
Third premium, S. B. Lane, Spiceland, Ind.....	Ribbon
Buff Wyandotte pullet, W. C. Pierce & Co., Indianapolis, Ind.....	2 00
Second premium, W. C. Pierce & Co., Indianapolis, Ind.....	1 50
Third premium, W. C. Pierce & Co., Indianapolis, Ind.....	Ribbon
Buff Wyandotte breeding pen, W. C. Pierce & Co., Indianapolis, Ind.	4 00
Second premium, W. C. Pierce & Co., Indianapolis, Ind.....	2 00
Third premium, S. B. Lane, Spiceland, Ind.....	Ribbon
Silver Wyandotte cock, R. E. Jones, Flatrock, Ind.....	2 50
Second premium, R. E. Jones, Flatrock, Ind.....	1 50
Third premium, J. A. Horning & Co., Shelbyville, Ind.....	Ribbon
Silver Wyandotte hen, Wm. Grose, Middletown, Ind.....	2 50
Second premium, Beaver Hill Farm, Beaver, Pa.....	1 50
Third premium, T. N. Smiley & Son, Milligan, Ind.....	Ribbon
Silver Wyandotte cockerel, Jos. Winglewitch, Middletown, Ind....	2 50
Second premium, Beaver Hill Farm, Beaver, Pa.....	1 50
Third premium, Jos. Winglewitch, Middletown, Ind.....	Ribbon
Silver Wyandotte pullet, Jos. Winglewitch, Middletown, Ind.....	2 50

Second premium, Beaver Hill Farm, Beaver, Pa.....	1 50
Third premium, Jos. Winglewitch, Middletown, Ind.....	Ribbon
Silver Wyandotte breeding pen, Jos. Winglewitch, Middletown, Ind.....	5 00
Second premium, Beaver Hill Farm, Beaver, Pa.....	3 00
Third premium, R. E. Jones, Flatrock, Ind.....	Ribbon
Golden Wyandotte cock, Fred D. Sparks, Zionsville, Ind.....	2 00
Second premium, R. E. Jones, Flatrock, Ind.....	1 00
Third premium, C. E. & W. Smith, Ashley, O.....	Ribbon
Golden Wyandotte hen, R. E. Jones, Flatrock, Ind.....	2 00
Second premium, R. E. Jones, Flatrock, Ind.....	1 00
Third premium, Adam F. May, Flatrock, Ind.....	Ribbon
Golden Wyandotte cockerel, C. E. & W. Smith, Ashley, O.....	2 00
Second premium, Fred D. Sparks, Zionsville, Ind.....	1 00
Third premium, Fred D. Sparks, Zionsville, Ind.....	Ribbon
Golden Wyandotte pullet, C. E. & W. Smith, Ashley, O.....	2 00
Second premium, C. E. & W. Smith, Ashley, O.....	1 00
Third premium, C. E. & W. Smith, Ashley, O.....	Ribbon
Golden Wyandotte breeding pen, C. E. & W. Smith, Ashley, O.....	5 00
Second premium, R. E. Jones, Flatrock, Ind.....	3 00
Third premium, Fred D. Sparks, Zionsville, Ind.....	Ribbon
White Wyandotte cock, C. E. & W. Smith, Ashley, O.....	3 00
Second premium, W. C. Pierce & Co., Indianapolis, Ind.....	2 00
Third premium, Ed. L. May, Butlerville, Ind.....	Ribbon
White Wyandotte hen, W. C. Pierce & Co., Indianapolis, Ind.....	3 00
Second premium, W. C. Pierce & Co., Indianapolis, Ind.....	2 00
Third premium, C. E. & W. Smith, Ashley, O.....	Ribbon
White Wyandotte cockerel, Beaver Hill Farm, Beaver, Pa.....	3 00
Second premium, C. H. Bell, Ashley, O.....	2 00
Third premium, H. E. Griffith, Crawfordsville, Ind.....	Ribbon
White Wyandotte pullet, H. E. Griffith, Crawfordsville, Ind.....	3 00
Second premium, J. J. Van Winkle, Mechanicsburg, Ind.....	2 00
Third premium, Beaver Hill Farm, Beaver, Pa.....	Ribbon
White Wyandotte breeding pen, W. C. Pierce & Co., Indianapolis..	5 00
Second premium, Beaver Hill Farm, Beaver, Pa.....	3 00
Third premium, H. E. Griffith, Crawfordsville, Ind.....	Ribbon

LEGHORN.

White cock (S. C.), C. H. Bell, Ashley, O.....	3 00
Second premium, Wm. Tobin, Indianapolis, Ind.....	2 00
Third premium, B. F. Hill, Indianapolis, Ind.....	Ribbon
White hen (S. C.), Wm. Tobin, Indianapolis, Ind.....	3 00
Second premium, B. F. Hill, Indianapolis, Ind.....	2 00
Third premium, J. J. Van Winkle, Mechanicsburg, Ind.....	Ribbon
White cockerel (S. C.), B. F. Hill, Indianapolis, Ind.....	3 00

Second premium, Wm. Tobin, Indianapolis, Ind.....	2 00
Third premium, Wm. Tobin, Indianapolis, Ind.....	Ribbon
White pullet (S. C.), Wm. Tobin, Indianapolis, Ind.....	3 00
Second premium, C. W. Phillips, Arlington, Ind.....	2 00
Third premium, Wm. Tobin, Indianapolis, Ind.....	Ribbon
White (S. C.) breeding pen, Wm. Tobin, Indianapolis, Ind.....	6 00
Second premium, B. F. Hill, Indianapolis, Ind.....	3 00
Third premium, C. W. Phillips, Arlington, Ind.....	Ribbon
White cock (R. C.), W. O. Swain, Manilla, Ind.....	2 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	1 00
Third premium—no premium awarded.....	
White hen (R. C.), T. N. Smiley & Son, Milligan, Ind.....	2 00
Second premium, W. H. Stuker, Indianapolis, Ind.....	1 00
Third premium, W. O. Swain, Manilla, Ind.....	Ribbon
White cockerel (R. C.), T. N. Smiley & Son, Milligan, Ind.....	2 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	1 00
Third premium, W. H. Stuker, Indianapolis, Ind.....	Ribbon
White pullet (R. C.), T. N. Smiley & Son, Milligan, Ind.....	2 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	1 00
Third premium, W. O. Swain, Manilla, Ind.....	Ribbon
Brown cock (S. C.), S. B. Lane, Spiceland, Ind.....	3 00
Second premium, W. O. Swain, Manilla, Ind.....	2 00
Third premium, Jos. J. Overman, Indianapolis, Ind.....	Ribbon
Brown hen (S. C.), Ed. B. Murphy, Carmel, Ind.....	3 00
Second premium, S. B. Lane, Spiceland, Ind.....	2 00
Third premium, W. O. Swain, Manilla, Ind.....	Ribbon
Brown cockerel (S. C.), S. B. Lane, Spiceland, Ind.....	3 00
Second premium, Ed. B. Murphy, Carmel, Ind.....	2 00
Third premium, W. O. Swain, Manilla, Ind.....	Ribbon
Brown pullet (S. C.), Ed. B. Murphy, Carmel, Ind.....	3 00
Second premium, Ed. B. Murphy, Carmel, Ind.....	2 00
Third premium, T. N. Smiley & Son, Milligan, Ind.....	Ribbon
Brown (S. C.), breeding pen, Ed. B. Murphy, Carmel, Ind.....	5 00
Second premium, S. B. Lane, Spiceland, Ind.....	3 00
Third premium, W. O. Swain, Manilla, Ind.....	Ribbon
Brown cock (R. C.), T. N. Smiley & Son, Milligan, Ind.....	2 00
Second premium, A. J. Webster, Columbia City, Ind.....	1 00
Third premium, T. N. Smiley & Son, Milligan, Ind.....	Ribbon
Brown hen (R. C.), T. N. Smiley & Son, Milligan, Ind.....	2 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	1 00
Brown cockerel (R. C.), T. N. Smiley & Son, Milligan, Ind.....	2 00
Second premium, A. J. Webster, Columbia City, Ind.....	1 00
Brown pullet (R. C.), T. N. Smiley & Son, Milligan, Ind.....	2 00
Second premium, A. J. Webster, Columbia City, Ind.....	1 00
Brown (R. C.), breeding pen, T. N. Smiley & Son, Milligan, Ind....	3 00

Buff cock, B. F. Hislop, Milford, Ind.....	2 00
Second premium, B. F. Hislop, Milford, Ind.....	1 00
Third premium, C. H. Bell, Ashley, Ohio.....	Ribbon
Buff hen, C. H. Bell, Ashley, Ohio.....	2 00
Second premium, B. F. Hislop, Milford, Ind.....	1 00
Third premium, C. H. Bell, Ashley, Ohio.....	Ribbon
Buff cockerel, C. S. Byers, Hazelrigg, Ind.....	2 00
Second premium, C. H. Bell, Ashley, Ohio.....	1 00
Third premium, C. H. Bell, Ashley, Ohio.....	Ribbon
Buff pullet, C. S. Byers, Hazelrigg, Ind.....	2 00
Second premium, C. S. Byers, Hazelrigg, Ind.....	1 00
Third premium, C. H. Bell, Ashley, Ohio.....	Ribbon
Buff breeding pen, C. H. Bell, Ashley, Ohio.....	3 00
Second premium, B. F. Hislop, Milford, Ind.....	1 00

HOUDAN.

Cock, C. E. & W. Smith, Ashley, Ohio.....	2 00
Second premium, C. E. & W. Smith, Ashley, Ohio.....	1 00
Third premium, John Evans, Greenfield, Ind.....	Ribbon
Hen, C. E. & W. Smith, Ashley, Ohio.....	2 00
Second premium, C. E. & W. Smith, Ashley, Ohio.....	1 00
Third premium, Ed L. May, Butlerville, Ind.....	Ribbon
Cockerel, C. E. & W. Smith, Ashley, Ohio.....	2 00
Second premium, C. E. & W. Smith, Ashley, Ohio.....	1 00
Third premium, C. E. & W. Smith, Ashley, Ohio.....	Ribbon
Pullet, C. E. & W. Smith, Ashley, Ohio.....	2 00
Second premium, C. E. & W. Smith, Ashley, Ohio.....	1 00
Third premium, John Evans, Greenfield, Ind.....	Ribbon
Breeding pen, C. E. & W. Smith, Ashley, Ohio.....	4 00
Second premium, C. E. & W. Smith, Ashley, Ohio.....	2 00
Third premium, John Evans, Greenfield, Ind.....	Ribbon

BLACK SPANISH.

Cock, J. A. Horning & Co., Shelbyville, Ind.....	2 00
Second premium, John Evans, Greenfield, Ind.....	1 00
Third premium, Louis Seidensticker & Son, Brightwood, Ind.....	Ribbon
Hen, J. A. Horning & Co., Shelbyville, Ind.....	2 00
Second premium, John Evans, Greenfield, Ind.....	1 00
Third premium, Louis Seidensticker & Son, Brightwood, Ind.....	Ribbon
Cockerel, second premium, Louis Seidensticker & Son, Brightwood, Ind.....	1 00
Pullet, J. A. Horning & Co., Shelbyville, Ind.....	2 00

MINORCA.

Black cock, C. E. & W. Smith, Ashley, Ohio.....	2 00
Second premium, Louis Clem, Bunker Hill, Ind.....	1 00
Third premium, W. O. Swain, Manilla, Ind.....	Ribbon
Black hen, W. O. Swain, Manilla, Ind.....	2 00
Second premium, H. L. Harlan, Indianapolis, Ind.....	1 00
Third premium, C. E. & W. Smith, Ashley, Ohio.....	Ribbon
Black cockerel, C. E. & W. Smith, Ashley, Ohio.....	2 00
Second premium, C. E. & W. Smith, Ashley, Ohio.....	1 00
Third premium, H. L. Harlan, Indianapolis, Ind.....	Ribbon
Black pullet, C. E. & W. Smith, Ashley, Ohio.....	2 00
Second premium, C. E. & W. Smith, Ashley, Ohio.....	1 00
Third premium, C. E. & W. Smith, Ashley, Ohio.....	Ribbon
Breeding pen, C. E. & W. Smith, Ashley, Ohio.....	4 00
Second premium, H. L. Harlan, Indianapolis, Ind.....	2 00
Third premium, C. E. & W. Smith, Ashley, Ohio.....	Ribbon
White cock, T. N. Smiley & Son, Milligan, Ind.....	1 00
White hen, T. N. Smiley & Son, Milligan, Ind.....	1 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	50
Third premium, T. N. Smiley & Son, Milligan, Ind.....	Ribbon
White cockerel, John Evans, Greenfield, Ind.....	1 00
White pullet, John Evans, Greenfield, Ind.....	1 00

HAMBURG.

Golden-spangled cock, T. H. Buck, Morristown, Ind.....	1 00
Golden-spangled hen, T. H. Buck, Morristown, Ind.....	1 00
Silver-spangled cock, W. O. Swain, Manilla, Ind.....	1 50
Second premium, T. N. Smiley & Son, Milligan, Ind.....	1 00
Third premium, T. H. Buck, Morristown, Ind.....	Ribbon
Silver-spangled hen, T. H. Buck, Morristown, Ind.....	1 50
Second premium, T. H. Buck, Morristown, Ind.....	1 50
Third premium, W. O. Swain, Manilla, Ind.....	Ribbon
Silver-spangled cockerel, W. O. Swain, Manilla, Ind.....	1 50
Second premium, W. O. Swain, Manilla, Ind.....	1 00
Third premium, T. N. Smiley & Son, Milligan, Ind.....	Ribbon
Silver-spangled pullet, W. O. Swain, Manilla, Ind.....	1 50
Second premium, T. N. Smiley & Son, Milligan, Ind.....	1 00
Third premium, T. N. Smiley & Son, Milligan, Ind.....	Ribbon
Silver-spangled breeding pen, W. O. Swain, Manilla, Ind.....	4 00
Second premium, T. H. Buck, Morristown, Ind.....	2 00
Third premium, T. N. Smiley & Son, Milligan, Ind.....	Ribbon

POLISH.

White-crested black cock, J. A. Horning & Co., Shelbyville, Ind....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	2 00
Third premium, T. H. Buck, Morristown, Ind.....	Ribbon
White-crested black hen, T. H. Buck, Morristown, Ind.....	1 00
Second premium, J. A. Horning & Co., Shelbyville, Ind.....	50
Third premium, T. H. Buck, Morristown, Ind.....	Ribbon
White-crested black cockerel, R. E. Jones, Flatrock, Ind.....	1 00
Second premium, R. E. Jones, Flatrock, Ind.....	50
White-crested black pullet, J. A. Horning & Co., Shelbyville, Ind..	1 00
Second premium, R. E. Jones, Flatrock, Ind.....	50
Third premium, R. E. Jones, Flatrock, Ind.....	Ribbon
White-crested black breeding pen, J. A. Horning & Co., Shelbyville, Ind.....	4 00
Second premium, T. H. Buck, Morristown, Ind.....	2 00
Third premium, R. E. Jones, Flatrock, Ind.....	Ribbon
Golden (plain or bearded) cock or cockerel, B. F. Duncan, Greenfield, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
Third premium, T. H. Buck, Morristown, Ind.....	Ribbon
Golden (plain or bearded) hen or pullet. No premium awarded.	
Silver (plain or bearded) cock, John Evans, Greenfield, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
Third premium, T. H. Buck, Morristown, Ind.....	Ribbon
Silver (plain or bearded) hen, T. H. Buck, Morristown, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
Third premium, T. H. Buck, Morristown, Ind.....	Ribbon
Silver (plain or bearded) cockerel, T. H. Buck, Morristown, Ind....	1 00
Silver (plain or bearded) pullet, T. H. Buck, Morristown, Ind.....	1 00
Second premium, John Evans, Greenfield, Ind.....	50
Silver (plain or bearded) breeding pen, T. H. Buck, Morristown, Ind.....	3 00

DORKING.

Any color cock or cockerel, T. N. Smiley & Son, Milligan, Ind.....	1 00
Second premium, Ed. L. May, Butlerville, Ind.....	50
Any color hen or pullet, T. N. Smiley & Son, Milligan, Ind.....	1 00
Second premium, Ed. L. May, Butlerville, Ind.....	50

REDCAP.

Hen, T. N. Smiley & Son, Milligan, Ind.....	1 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	50

GAME.

Black-breasted red cock, Wesley Lanius, Greensburg, Ind.....	2 00
Second premium, Wesley Lanius, Greensburg, Ind.....	1 00
Black-breasted red hen, Wesley Lanius, Greensburg, Ind.....	2 00
Second premium, Wesley Lanius, Greensburg, Ind.....	1 00
Black-breasted red cockerel, Wesley Lanius, Greensburg, Ind....	2 00
Second premium, Wesley Lanius, Greensburg, Ind.....	1 00
Third premium, Wesley Lanius, Greensburg, Ind.....	Ribbon
Black-breasted red pullet, Wesley Lanius, Greensburg, Ind.....	2 00
Second premium, Wesley Lanius, Greensburg, Ind.....	1 00
Black-breasted red breeding pen, Wesley Lanius, Greensburg, Ind.	4 00
Red Pile cock or cockerel, Wesley Lanius, Greensburg, Ind.....	1 00
Second premium, Wesley Lanius, Greensburg, Ind.....	50
Red Pile hen or pullet, Wesley Lanius, Greensburg, Ind.....	1 00
Second premium, Wesley Lanius, Greensburg, Ind.....	50
Cornish Indian cock, C. E. & W. Smith, Ashley, O.....	2 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	1 00
Third premium, Wesley Lanius, Greensburg, Ind.....	Ribbon
Cornish Indian hen, C. E. & W. Smith, Ashley, O.....	2 00
Second premium, C. E. & W. Smith, Ashley, O.....	1 00
Third premium, Wesley Lanius, Greensburg, Ind.....	Ribbon
Cornish Indian cockerel, C. E. & W. Smith, Ashley, O.....	2 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	1 00
Third premium, T. N. Smiley & Son, Milligan, Ind.....	Ribbon
Cornish Indian pullet, C. E. & W. Smith, Ashley, O.....	2 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	1 00
Third premium, C. E. & W. Smith, Ashley, O.....	Ribbon
Cornish Indian breeding pen, C. E. & W. Smith, Ashley, O.....	4 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	2 00
Third premium, Wesley Lanius, Greensburg, Ind.....	Ribbon

BANTAMS—SEABRIGHTS.

Golden cock, R. E. Jones, Flatrock, Ind.....	1 00
Second premium, Thos. Taggart, Jr., Indianapolis, Ind.....	50
Third premium, Louis Seldensticker & Son, Brightwood, Ind.....	Ribbon
Golden hen, R. E. Jones, Flatrock, Ind.....	1 00
Second premium, Thos. Taggart, Jr., Indianapolis, Ind.....	50
Third premium, Louis Seldensticker & Son, Brightwood, Ind.....	Ribbon
Golden cockerel, Thos. Taggart, Indianapolis, Ind.....	1 00
Second premium, H. L. Harlan, Indianapolis, Ind.....	50
Golden pullet, R. E. Jones, Flatrock, Ind.....	1 00
Second premium, Thos. Taggart, Jr., Indianapolis, Ind.....	50
Third premium, Thos. Taggart, Jr., Indianapolis, Ind.....	Ribbon

Golden breeding pen, R. E. Jones, Flatrock, Ind.....	2 00
Second premium, Thos. Taggart, Jr., Indianapolis, Ind.....	1 00
Third premium, Louis Seidensticker & Son, Brightwood, Ind.....	Ribbon
Silver cock or cockerel, Louis Seidensticker & Son, Brightwood	1 00
Second premium, Mrs. R. W. Williams, Indianapolis, Ind.....	50
Third premium, R. E. Jones, Flatrock, Ind.....	Ribbon
Silver hen or pullet, Louis Seidensticker & Son, Brightwood, Ind..	1 00
Second premium, R. E. Jones, Flatrock, Ind.....	50
Rose (C. B.) hen or pullét, Ed. L. May, Butlerville, Ind.....	1 00

GAME BANTAMS.

Black-breasted red cock, J. A. Horning & Co., Shelbyville, Ind....	1 00
Second premium, Harvey Nichols, Indianapolis, Ind.....	50
Third premium, Harvey Nichols, Indianapolis, Ind.....	Ribbon
Black-breasted red hen, J. A. Horning & Co., Shelbyville, Ind.....	1 00
Second premium, S. A. Nofztger, North Manchester, Ind.....	50
Third premium, Thos. Taggart, Jr., Indianapolis, Ind.....	Ribbon
Black-breasted red cockerel, Thos. Taggart, Jr., Indianapolis, Ind..	1 00
Second premium, J. A. Horning & Co., Shelbyville, Ind.....	50
Third premium, S. A. Nofztger, North Manchester, Ind.....	Ribbon
Black-breasted red pullet, Thos. Taggart, Jr., Indianapolis, Ind....	1 00
Second premium, S. A. Nofztger, North Manchester, Ind.....	50
Third premium, S. A. Nofztger, North Manchester, Ind.....	Ribbon
Black-breasted red breeding pen, Thos. Taggart, Jr., Indianapolis.	3 00
Second premium, J. A. Horning & Co., Shelbyville, Ind.....	2 00
Third premium, S. A. Nofztger, North Manchester, Ind.....	Ribbon
Silver duckwing cock, John Evans, Greenfield, Ind.....	1 00
Second premium, B. F. Duncan, Greenfield, Ind.....	50
Silver duckwing hen, J. A. Horning & Co., Shelbyville, Ind.....	1 00
Second premium, Wesley Lanius, Greensburg, Ind.....	50
Third premium, B. F. Duncan, Greenfield, Ind.....	Ribbon
Silver duckwing cockerel, second premium, T. H. Buck, Morris- town, Ind.....	50
Silver duckwing pullet, B. F. Duncan, Greenfield, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
Third premium, B. F. Duncan, Greenfield, Ind.....	Ribbon
Red Pyle cock or cockerel, Wesley Lanius, Greensburg, Ind.....	1 00
Second premium, Wesley Lanius, Greensburg, Ind.....	50
Third premium, John Evans, Greenfield, Ind.....	Ribbon
Red Pyle hen or pullet, John Evans, Greenfield, Ind.....	1 00

BUFF COCHIN BANTAMS.

Cock, Clair F. Johnson, Rushville, Ind.....	1 00
Second premium, Clair F. Johnson, Rushville, Ind.....	50
Hen, John Evans, Greenfield, Ind.....	1 00
Second premium, Clair F. Johnson, Rushville, Ind.....	50
Third premium, J. A. Horning & Co., Shelbyville, Ind.....	Ribbon
Cockerel, John Krumholz, Indianapolis, Ind.....	1 00
Second premium, Henry Sullivan, Indianapolis, Ind.....	50
Third premium, John Krumholz, Indianapolis, Ind.....	Ribbon
Pullet, John Krumholz, Indianapolis, Ind.....	1 00
Second premium, John Krumholz, Indianapolis, Ind.....	50
Third premium, John Krumholz, Indianapolis, Ind.....	Ribbon
Breeding pen, John Krumholz, Indianapolis, Ind.....	2 00
Second premium, Clair F. Johnson, Rushville, Ind.....	1 00
Third premium, H. Matzke, Indianapolis, Ind.....	Ribbon

TURKEYS.

Bronze cock, B. F. Hislop, Milford, Ind.....	3 00
Second premium, B. F. Ulery, New Richmond, Ind.....	2 00
Third premium, B. F. Ulery, New Richmond, Ind.....	Ribbon
Bronze hen, B. F. Ulery, New Richmond, Ind.....	3 00
Second premium, B. F. Hislop, Milford, Ind.....	2 00
Third premium, B. F. Ulery, New Richmond, Ind.....	Ribbon
Bronze cockerel, B. F. Hislop, Milford, Ind.....	3 00
Second premium, B. F. Ulery, New Richmond, Ind.....	2 00
Third premium, B. F. Ulery, New Richmond, Ind.....	Ribbon
Bronze pullet, B. F. Ulery, New Richmond, Ind.....	3 00
Second premium, B. F. Hislop, Milford, Ind.....	2 00
Third premium, B. F. Ulery, New Richmond, Ind.....	Ribbon
White Holland cock, Samuel Gardner, Fincastle, Ind.....	3 00
Second premium, C. H. Bell, Ashley, O.....	2 00
Third premium, C. E. & W. Smith, Ashley, O.....	Ribbon
White Holland hen, J. A. Horning & Co., Shelbyville, Ind.....	3 00
Second premium, Samuel Gardner, Fincastle, Ind.....	2 00
Third premium, C. E. & W. Smith, Ashley, O.....	Ribbon
White Holland cockerel, Samuel Gardner, Fincastle, Ind.....	3 00
Second premium, Samuel Gardner, Fincastle, Ind.....	2 00
Third premium, Henry Klinger, Lebanon, Ind.....	Ribbon
White Holland pullet, Samuel Gardner, Fincastle, Ind.....	3 00
Second premium, Samuel Gardner, Fincastle, Ind.....	2 00
Third premium, Henry Klinger, Lebanon, Ind.....	Ribbon
Buff cockerel, A. W. Porter, Maywood, Ind.....	2 00
Second premium, A. W. Porter, Maywood, Ind.....	1 00
Buff pullet, A. W. Porter, Maywood, Ind.....	2 00
Second premium, A. W. Porter, Maywood, Ind.....	1 00

GEESE.

Pair of Toulouse, old, B. F. Hislop, Milford, Ind.....	3 00
Second premium, J. A. Horning & Co., Shelbyville, Ind.....	2 00
Pair of Toulouse, young, B. F. Hislop, Milford, Ind.....	3 00
Second premium, J. A. Horning & Co., Shelbyville, Ind.....	2 00
Third premium, T. N. Smiley & Son, Milligan, Ind.....	Ribbon
Pair of Embden, old, C. H. Bell, Ashley, O.....	3 00
Second premium, T. N. Smiley & Son, Milligan, Ind.....	2 00
Third premium, J. S. Smiley & Son, Parkville, Ind.....	Ribbon
Pair of Embden, young, C. H. Bell, Ashley, O.....	3 00
Second premium, J. A. Horning & Co., Shelbyville, Ind.....	2 00
Third premium, J. S. Smiley & Son, Parkville, Ind.....	Ribbon
Pair brown Chinese, old or young, J. A. Horning & Co., Shelbyville	2 00
Second premium, J. A. Horning & Co., Shelbyville, Ind.....	1 00
Pair white Chinese, old or young, T. N. Smiley & Son, Milligan, Ind.	2 00
Second premium, John Evans, Greenfield, Ind.....	1 00

DUCKS.

Pair Pekin, old, Fry & Brannen, Hope, Ind.....	3 00
Second premium, C. E. & W. Smith, Ashley, O.....	2 00
Pair Pekin, young, C. E. & W. Smith, Ashley, O.....	3 00
Second premium, Fry & Brannen, Hope, Ind.....	2 00
Pair Rouen, old, C. E. & W. Smith, Ashley, O.....	3 00
Second premium, J. S. Smiley & Son, Parkville, Ind.....	2 00
Pair Rouen, young, C. E. & W. Smith, Ashley, O.....	3 00
Second premium, C. E. & W. Smith, Ashley, O.....	2 00
Third premium, B. F. Duncan, Greenfield, Ind.....	Ribbon

PIGEONS.

Best display, ten varieties, Chester Baker, Indianapolis, Ind.....	10 00
Second premium, Ed. L. May, Butlerville, Ind.....	5 00

RABBITS.

Pair Belgian or German, C. S. Byers, Hazelrigg, Ind.....	5 00
Second premium, Will A. Graffs, Logansport, Ind.....	3 00
Third premium, Thos. Taggart, Jr., Indianapolis, Ind.....	Ribbon

DEPARTMENT I.—AGRICULTURE.

CLASS XXXVII—Grain and Seeds.

(A. D. Shomel, Judge, Urbana, Ill.)

NORTHERN DIVISION OF INDIANA.

Twenty ears yellow corn, John W. Moorehouse, Albion, Ind.....	\$8 00
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CENTRAL DIVISION OF INDIANA.

Twenty ears yellow corn, Newt. Brown, Franklin, Ind.....	8 00
Second premium, L. B. Clore, Franklin, Ind.....	4 00
Twenty ears white corn, Marley Riley, Thorntown, Ind.....	8 00
Second premium, Fremont Eastes, Mt. Comfort, Ind.....	4 00
Twenty ears, any other variety, Geo. M. Rumler, Mohawk, Ind..	8 00
Second premium, J. D. Whitesides, Franklin, Ind.....	4 00

SOUTHERN DIVISION OF INDIANA.

Twenty ears yellow corn, W. F. Tracy, Rising Sun, Ind.....	8 00
Twenty ears white corn, C. W. Binkley, Princeton, Ind.....	8 00
Second premium, C. W. Binkley, Princeton, Ind.....	4 00
Twenty ears, any other variety. No premium awarded.	

OPEN TO THE WORLD.

Twenty ears yellow corn, J. L. Keckley, Marysville, O.....	8 00
Second premium, L. B. Clore, Franklin, Ind.....	4 00
Twenty ears white corn, L. B. Clore, Franklin, Ind.....	8 00
Second premium, J. D. Whitesides, Franklin, Ind.....	4 00
Twenty ears, any other variety, J. D. Whitesides, Franklin, Ind..	8 00
Second premium, Joe R. Overstreet, Franklin, Ind.....	4 00
Twenty ears white flint hominy corn, Joe R. Overstreet, Franklin	5 00
Second premium, Whipps Bros., Marion, O.....	2 00
One peck white rice popcorn, Geo. M. Rumler, Mohawk, Ind.....	2 00
Second premium, Lunis Sandford, Philadelphia, Ind.....	1 00
One peck golden popcorn, J. L. Keckley, Marysville, O.....	2 00
Second premium, L. B. Clore, Franklin, Ind.....	1 00
One peck any other variety popcorn, J. L. Keckley, Marysville, O.	2 00

Second premium, Lunis Sandford, Philadelphia, Ind.....	1 00
Best display of corn, L. B. Clore, Franklin, Ind.....	60 00
Second premium, Joe R. Overstreet, Franklin, Ind.....	40 00
Third premium, J. D. Whitesides, Franklin, Ind.....	20 00
Best half bushel white winter wheat, J. L. Keckley, Marysville, O.	4 00
Second premium, J. L. Keckley, Marysville, O.....	2 00
One-half bushel red winter wheat, F. M. Sanford, Philadelphia, Ind.	4 00
Second premium, J. L. Keckley, Marysville, O.....	2 00
One-half bushel Fultz wheat, J. L. Keckley, Marysville, O.....	4 00
Second premium, J. L. Keckley, Marysville, O.....	2 00
One-half bushel red spring wheat, J. L. Keckley, Marysville, O.	2 00
Second premium, J. L. Keckley, Marysville, O.....	2 00
Display grain in straw, Whipps Bros., Marion, O.....	10 00
Second premium, J. L. Keckley, Marysville, O.....	5 00
Display of grasses, J. L. Keckley, Marysville, O.....	8 00
Second premium, Whipps Bros., Marion, O.....	4 00
One-half bushel rye, Whipps Bros., Marion, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
One-half bushel white oats, J. L. Keckley, Marysville, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
One-half bushel black oats, J. L. Keckley, Marysville, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
One-half bushel silver hull buckwheat, J. L. Keckley, Marysville, O.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
One-half bushel of barley, J. L. Keckley, Marysville, O.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
One half bushel millet seed, Whipps Bros., Marion, O.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
One-half bushel timothy seed, J. L. Keckley, Marysville, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
One-half bushel orchard grass seed, Whipps Bros., Marion, O.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
One-half bushel Hungarian grass seed, J. L. Keckley, Marysville, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
One-half bushel Kentucky blue-grass seed, J. L. Keckley, Marysville, O.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
One-half bushel mammoth clover seed, J. L. Keckley, Marysville, O.....	2 00
Second premium, John Marvel, Royalton, Ind.....	1 00
One-half bushel red clover seed John Marvel, Royalton, Ind.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	2 00

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One-half bushel flaxseed, John Marvel, Royalton, Ind.....	2 00
Second premium, Geo. M. Rumler, Mohawk, Ind.....	1 00
Collection grain and seed, J. L. Keckley, Marysville, O.....	10 00
second premium, John Marvel, Royalton, Ind.....	5 00
Display and collection by any county or society in Indiana, J. D. Whitesides, Franklin, Ind.....	30 00

CLASS XXXVIII—Vegetables.

(Ira B. Hurst, Judge, Wagoner, Ind.)

Three New York purple egg plant, D. F. Elwanger, Indianapolis..	\$2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Twelve best cucumbers, J. D. Whitesides, Franklin, Ind.....	2 00
Second premium, J. J. Milhous, Valley Mills, Ind.....	1 00
Six cauliflowers, Chas. Gieseking, Indianapolis, Ind.....	2 00
Twelve ears late sweet corn, John Marvel, Royalton, Ind.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
Twelve ears early sweet corn, John Marvel, Royalton, Ind.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Three Hubbard squash, Whipps Bros., Marion, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Three Boston Marrow squash, John Marvel, Royalton, Ind.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
Three Marblehead squash, John Marvel, Royalton, Ind.....	2 00
Second premium, F. M. Sanford, Philadelphia, Ind.....	1 00
Three red Hubbard squash, Whipps Bros., Marion, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Three Kershaw squash, J. L. Keckley, Marysville, O.....	2 00
Second premium, Harry Bennett, Franklin, Ind.....	1 00
Three summer crooked neck squash, J. L. Keckley, Marysville, O.	2 00
Second premium, Harry Bennett, Franklin, Ind.....	1 00
Three field pumpkins, J. D. Whitesides, Franklin, Ind.....	2 00
Second premium, C. R. Milhous, Spencer, Ind.....	1 00
Largest squash, John Marvel, Royalton, Ind.....	2 00
Second premium, Sylvester Johnson, Irvington, Ind.....	1 00
Largest pumpkins, J. D. Whitesides, Franklin, Ind.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Six Drumhead cabbage, Whipps Bros., Marion, O.....	2 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00
Six flat Dutch cabbage, Whipps Bros., Marion, O.....	2 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00
Six early cabbage, J. L. Keckley, Marysville, O.....	2 00
Second premium, Chas. Gieseking, Indianapolis, Ind.....	1 00
Six red cabbage, Whipps Bros., Marion, O.....	2 00

Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00
Twelve stalks celery, D. F. Elwanger, Indianapolis, Ind.....	2 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00
Best display of celery, D. F. Elwanger, Indianapolis, Ind.....	3 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	2 00
One-half peck Lima beans, germ shell, Whipps Bros., Marion, O..	2 00
Second premium, John Marvel, Royalton, Ind.....	1 00
One-half peck white Marrowfat beans, Whipps Bros., Marion, O..	2 00
Second premium, Mrs. C. E. Hollingsworth, Indianapolis, Ind....	1 00
One-half peck white Navy beans, J. D. Whitesides, Franklin, Ind.	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
One-half peck colored kidney beans, Harry Bennett, Franklin, Ind.	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
One-half peck white kidney beans, J. L. Keckley, Marysville, O..	2 00
Second premium, John Marvel, Royalton, Ind.....	1 00
One-half peck garden peas, dry, Whipps Bros., Marion, O.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
Peck purple tomatoes, D. F. Elwanger, Indianapolis, Ind.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Peck red tomatoes, D. F. Elwanger, Indianapolis, Ind.....	2 00
Second premium, John Marvel, Royalton, Ind.....	1 00
Peck yellow tomatoes, Chas. Giesecking, Indianapolis, Ind.....	2 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00
Collection tomatoes, ten varieties, D. F. Elwanger, Indianapolis	3 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00
Six largest and best nutmeg melons, D. F. Elwanger, Indianapolis,	
Ind	2 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00
Six largest and best muskmelons, D. F. Elwanger, Indianapolis,	
Ind	2 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00
Gypsy water melons, J. S. Duckwall, Indianapolis, Ind.....	2 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00
Sweet Heart melons, D. F. Elwanger, Indianapolis, Ind.....	2 00
Second premium, J. S. Duckwall, Indianapolis, Ind.....	1 00
White Icing melons, D. F. Elwanger, Indianapolis, Ind.....	2 00
Second premium, J. S. Duckwall, Indianapolis, Ind.....	1 00
Display muskmelons, D. F. Elwanger, Indianapolis, Ind.....	5 00
Display watermelons, J. L. Keckley, Marysville, O.....	5 00
Second premium, J. S. Duckwall, Indianapolis, Ind.....	3 00
Collection of vegetables, D. F. Elwanger, Indianapolis, Ind.....	20 00
Second premium, Chas. Giesecking, Indianapolis, Ind.....	10 00
Peck peppers for pickling, W. B. Flick, Lawrence, Ind.....	2 00
Second premium, John Marvel, Royalton, Ind.....	1 00
Display of peppers, D. F. Elwanger, Indianapolis, Ind.....	2 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00

CLASS XXXIX—Root Crop.

(Ira B. Hurst, Judge, Wagoner, Ind.)

Six purple top turnips, J. D. Whitesides, Franklin, Ind.....	\$2 00
Second premium, Whipps Bros., Marion, O.....	1 00
Six any other variety turnips, Whipps Bros., Marion, O.....	2 00
Second premium, Chas. Giesekeing, Indianapolis, Ind.....	1 00
Six carrots for table, Harry Bennett, Franklin, Ind.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Six carrots for stock, Harry Bennett, Franklin, Ind.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Six carrots salsify, Whipps Bros., Marion, O.....	2 00
Second premium, Chas. Giesekeing, Indianapolis, Ind.....	1 00
Six roots horseradish, Chas. Giesekeing, Indianapolis, Ind.....	2 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00
Six long red table beets, Whipps Bros., Marion, O.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Six turnip beets, Harry Bennett, Franklin, Ind.....	2 00
Second premium, Harry Bennett, Franklin, Ind.....	1 00
Six sugar beets, J. D. Whitesides, Franklin, Ind.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Six red mangelwurzel, J. D. Whitesides, Franklin, Ind.....	2 00
Second premium, John Marvel, Royaltan, Ind.....	1 00
Six parsnips, J. D. Whitesides, Franklin, Ind.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Six turnip radish, same kind, Harry Bennett, Franklin, Ind.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Six winter radish, Chas. Giesekeing, Indianapolis, Ind.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Six long summer radishes, J. D. Whitesides, Franklin, Ind.....	2 00
Second premium, Harry Bennett, Franklin, Ind.....	1 00
Peck Prize-taker onions, D. F. Elwanger, Indianapolis, Ind.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Peck Yellow Globe onions, Whipps Bros., Marion, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Peck White Globe onions, D. F. Elwanger, Indianapolis, Ind.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
One-half peck yellow onion sets, D. F. Elwanger, Indianapolis, Ind	2 00
Second premium, Chas. Giesekeing, Indianapolis, Ind.....	1 00
One-half peck red onion sets, Harry Bennett, Franklin, Ind.....	2 00
Second premium, W. F. Tracy, Rising Sun, Ind.....	1 00
One-half peck white onion sets, D. F. Elwanger, Indianapolis, Ind.....	2 00
Second premium, Chas. Giesekeing, Indianapolis, Ind.....	1 00

Broom corn, John Marvel, Royalton, Ind.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
Potato onions, J. L. Keckley, Marysville.....	2 00
Second premium, John Marvel, Royalton, Ind.....	1 00
Yellow Danver onions, Whipps Bros., Marion, O.....	2 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00
Red Weatherfield onions, D. F. Elwanger, Indianapolis, Ind.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Display onions, all varieties, Whipps, Bros., Marion, O.....	5 00
Second premium, J. L. Keckley, Marysville, O.....	3 00
Largest display root crops, D. F. Elwanger, Indianapolis, Ind.....	5 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	3 00

CLASS XI.—Potatoes.

Peck Early Rose, J. L. Keckley, Marysville, O.....	\$2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Peck Early Ohio, Whipps Bros., Marion, O.....	2 00
Second premium, W. O. Swain, Manilla, Ind.....	1 00
Peck Bliss Triumph, J. D. Whitesides, Franklin, Ind.....	2 00
Second premium, Geo. M. Rumler, Mohawk, Ind.....	1 00
Peck Uncle Sam, J. D. Whitesides, Franklin, Ind.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Peck White Rose, J. L. Keckley, Marysville, O.....	2 00
Second premium, Whipps, Bros., Marion, O.....	1 00
Peck White Elephant, Whipps Bros., Marion, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Peck Beauty Hebron, J. L. Keckley, Marysville, O.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
Peck Rural New Yorker No. 3, J. L. Keckley, Marysville, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Peck Queen of the West, W. O. Swain, Manilla, Ind.....	2 00
Second premium, C. W. Binkley, Princeton, Ind.....	1 00
Peck Empire State, Whipps Bros., Marion, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Peck Green Mountain, Whipps Bros., Marion, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Peck Early Puritan, J. L. Keckley, Marysville, O.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
Peck Early Harvest, J. L. Keckley, Marysville, O.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
Peck Burbank Seedling, Whipps Bros., Marion, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Peck Bovee, J. L. Keckley, Marysville, O.....	2 00

Second premium, Whipps Bros., Marion, O.....	1 00
Peck Duchess, J. L. Keckley, Marysville, O.....	2 00
Second premium, Whipps Bros., Marion, O.....	1 00
Collection of potatoes, J. L. Keckley, Marysville, O.....	8 00
Second premium, Whipps, Bros., Marion, O.....	4 00
Yellow sweet potatoes, Geo. M. Rumler, Mohawk, Ind.....	2 00
Second premium, D. F. Elwanger, Indianapolis, Ind.....	1 00
Peck red sweet potatoes, D. F. Elwanger, Indianapolis, Ind.....	2 00
Second premium, Chas. Gieseking, Indianapolis, Ind.....	1 00
Display of sweet potatoes, D. F. Elwanger, Indianapolis, Ind....	5 00
Second premium, J. L. Keckley, Marysville, O.....	3 00

DEPARTMENT J.—HORTICULTURE.

CLASS XLI--Apples.

(Sylvester Johnson, Judge, Irvington, Ind.)

Fifteen varieties for home use, W. D. Thomas, Grover, Ind.....	\$15 00
Second premium, J. Y. Demaree, Bud, Ind.....	10 00
Ten varieties for market, B. F. Cole, Trafalgar, Ind.....	10 00
Second premium, W. D. Thomas, Grover, Ind.....	6 00
Five varieties for culinary purposes. No premium awarded.	
Plate Maiden Blush, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, W. B. Flick, Lawrence, Ind.....	1 00
Plate Smith Cider, H. C. Weaver, Shelbyville, Ind.....	1 50
Second premium, J. Y. Demaree, Bud, Ind.....	1 00
Plate Ben Davis, Joe A. Burton, Orleans, Ind.....	1 50
Second premium, Joe A. Burton, Orleans, Ind.....	1 00
Plate Rome Beauty, W. D. Thomas, Grover, Ind.....	1 50
Second premium, Joe A. Burton, Orleans, Ind.....	1 00
Plate Winesap, Joe A. Burton, Orleans, Ind.....	1 50
Second premium, B. F. Cole, Trafalgar, Ind.....	1 00
Plate Rambo, J. Y. Demaree, Bud, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Yellow Bellflower, B. F. Cole, Trafalgar, Ind.....	1 50
Second premium, W. D. Thomas, Grover, Ind.....	1 00
Plate Fallawater, W. D. Thomas, Grover, Ind.....	1 50
Second premium, Samuel L. Hazelett, Greencastle, Ind.....	1 00
Plate Fall Pippin, W. H. Vance, Springport, Ind.....	1 50
Second premium, B. F. Cole, Trafalgar, Ind.....	1 00
Plate Willow Twig, Mrs. W. B. Flick, Lawrence, Ind.....	1 50

Second premium, W. B. Flick, Lawrence, Ind.....	1 00
Plate Westfield (Seek-No-Further). No premium awarded.	
Plate Wagner, C. P. Bradley, South Bend, Ind.....	1 50
Plate Gravenstein, B. F. Cole, Trafalgar, Ind.....	1 50
Second premium, H. M. Stout, Trafalgar, Ind.....	1 00
Plate Fameuse or Snow, W. D. Thomas, Grover, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Moore Sweet, B. F. Cole, Trafalgar, Ind.....	1 50
Plate Tompkin's King, W. D. Thomas, Grover, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Hubbardston, W. D. Thomas, Grover, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Red Canada, B. F. Cole, Trafalgar, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Rhode Island Greening, C. P. Bradley, South Bend, Ind....	1 50
Second premium, W. H. Vance, Springport, Ind.....	1 00
Plate Fall Wine, W. D. Thomas, Grover, Ind.....	1 50
Plate Wolf River, Samuel L. Hazelett, Greencastle, Ind.....	1 50
Plate Clayton, W. B. Flick, Lawrence, Ind.....	1 50
Second premium, J. Y. Demaree, Bud, Ind.....	1 00
Plate White Pippin, W. D. Thomas, Grover, Ind.....	1 50
Second premium, W. B. Flick, Lawrence, Ind.....	1 00
Plate Baldwin, H. C. Weaver, Shelbyville, Ind.....	1 50
Second premium, Geo. M. Rumler, Mohawk, Ind.....	1 00
Plate York Imperial, J. Y. Demaree, Bud, Ind.....	1 50
Second premium, Samuel L. Hazelett, Greencastle, Ind.....	1 00
Plate Northern Spy, H. M. Stout, Trafalgar, Ind.....	1 50
Second premium, W. D. Thomas, Grover, Ind.....	1 00
Plate Grimes Golden, Joe A. Burton, Orleans, Ind.....	1 50
Second premium, B. F. Cole, Trafalgar, Ind.....	1 00
Plate Roman Stem, W. H. Vance, Springport, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Indiana Favorite, W. D. Thomas, Grover, Ind.....	1 50
Second premium, J. W. Daubenspeck, Mattsville, Ind.....	1 00
Plate Belmont, W. H. Vance, Springport, Ind.....	1 50
Second premium. No premium awarded.	
Plate Jonathan, W. B. Flick, Lawrence, Ind.....	1 50
Second premium, W. D. Thomas, Grover, Ind.....	1 00
Plate Lansingburg, W. D. Thomas, Grover, Ind.....	1 50
Second premium, W. H. Vance, Springport, Ind.....	1 00
Plate Talman Sweet, J. Y. Demaree, Bud, Ind.....	1 50
Second premium, Samuel L. Hazelett, Greencastle, Ind.....	1 00
Plate Vandevere, W. D. Thomas, Grover, Ind.....	1 50
Second premium, W. H. Vance, Springport, Ind.....	1 00
Plate Rall's Genet, W. B. Flick, Lawrence, Ind.....	1 50

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Second premium, Joe A. Burton, Orleans, Ind.....	1 00
Plate Wealthy, W. D. Thomas, Grover, Ind.....	1 50
Second premium, B. F. Cole, Trafalgar, Ind.....	1 00
Plate Stark, Samuel L. Hazelett, Greencastle, Ind.....	1 50
Second premium, W. H. Vance, Springport, Ind.....	1 00
Plate Pewaukee, W. D. Thomas, Grover, Ind.....	1 50
Second premium, Samuel L. Hazelett, Greencastle, Ind.....	1 00
Plate English Russett, H. C. Weaver, Shelbyville, Ind.....	1 50
Second premium, John W. Moorhouse, Albion, Ind.....	1 00

CRAB APPLES.

Plate Hyslop, W. B. Flick, Lawrence, Ind.....	1 50
Second premium, B. F. Cole, Trafalgar, Ind.....	1 00
Plate Red Siberian, F. M. Sanford, Philadelphia, Ind.....	1 50
Plate Transcendent, W. B. Flick, Lawrence, Ind.....	1 50
Second premium, B. F. Cole, Trafalgar, Ind.....	1 00
Five varieties for family use, W. B. Flick, Lawrence, Ind.....	5 00
Second premium, H. C. Weaver, Shelbyville, Ind.....	3 00
Five varieties for market, W. B. Flick, Lawrence, Ind.....	5 00

PEARS.

Plate Bartlett, H. H. Swaim, South Bend, Ind.....	1 50
Second premium, B. F. Cole, Trafalgar, Ind.....	1 00
Plate Anjou, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, C. F. Cole, Trafalgar, Ind.....	1 00
Plate Angouleme (Duchess), C. P. Bradley, South Bend, Ind.....	1 50
Second premium, H. H. Swaim, South Bend, Ind.....	1 00
Plate Flemish Beauty, J. Y. Demaree, Bud, Ind.....	1 50
Second premium, B. F. Cole, Trafalgar, Ind.....	1 00
Plate Howell, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, H. H. Swaim, South Bend, Ind.....	1 00
Plate Keiffer, John Marvel, Royalton, Ind.....	1 50
Second premium, H. H. Swaim, South Bend, Ind.....	1 00
Plate Louis Bon, H. H. Swaim, South Bend, Ind.....	1 50
Plate Sheldon, John Marvel, Royalton, Ind.....	1 50
Second premium, Sylvester Johnson, Irvington, Ind.....	1 00
Plate Seckel, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, H. H. Swaim, South Bend, Ind.....	1 00
Plate Easter Beurre, W. H. Vance, Springport, Ind.....	1 50
Plate Lawrence, H. H. Swaim, South Bend, Ind.....	1 50
Second premium, Geo. M. Rumler, Mohawk, Ind.....	1 00

Plate Winter Nells, W. D. Thomas, Grover, Ind.....	1 50
Second premium, B. F. Cole, Trafalgar, Ind.....	1 00
Plate Vickar, H. H. Swaim, South Bend, Ind.....	1 50
Second premium, John W. Moorhouse, Albion, Ind.....	1 00
Plate Onondago, H. H. Swaim, South Bend, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00

PEACHES.

Six varieties for any purpose, B. F. Cole, Trafalgar, Ind.....	6 00
Second premium, W. H. Vance, Springport, Ind.....	3 00
Three varieties for market, C. P. Bradley, South Bend, Ind.....	3 00
Second premium, W. B. Flick, Lawrence, Ind.....	1 50
Plate clings, Sylvester Johnson, Irvington, Ind.....	1 50
Second premium, J. Y. Demaree, Bud, Ind.....	1 00
Plate free stones, Mrs. W. H. Silver, Indianapolis, Ind.....	1 50
Second premium, Geo. M. Rumler, Mohawk, Ind.....	1 00
Plate seedlings not exhibited before. No premium awarded.	

QUINCES.

Collection, three varieties, W. B. Flick, Lawrence, Ind.....	3 00
Second premium, C. P. Bradley, South Bend, Ind.....	1 50

SINGLE PLATES.

Plate Orange Quince, W. B. Flick, Lawrence, Ind.....	1 50
Second premium, John W. Moorhouse, Albion, Ind.....	1 00
Plate Meche's Prolific, C. P. Bradley, South Bend, Ind.....	1 50
Plate Champlon, C. P. Bradley, South Bend, Ind.....	1 50
Plate Missouri Mammoth, W. B. Flick, Lawrence, Ind.....	1 50

PLUMS.

Collection native plums, John Marvel, Royalton, Ind.....	2 00
Second premium, J. W. Daubenspeck, Mattsville, Ind.....	1 00
Collection European class, C. P. Bradley, South Bend, Ind.....	2 00
Collection Japanese class. No premium awarded.	
Plate native plums. No premium awarded.	
Plate Japanese plums, C. P. Bradley, South Bend, Ind.....	1 50
Plate European plums, H. M. Stout, Trafalgar, Ind.....	1 50
Second premium, John Marvel, Royalton, Ind.....	1 00

GRAPES (GROWN IN OPEN AIR).

Six varieties for family use, C. P. Bradley, South Bend, Ind....	3 00
Second premium, C. A. Saltmarsh, Seymour, Ind.....	1 50
Six varieties for market, C. P. Bradley, South Bend, Ind.....	3 00

Second premium, C. A. Saltmarsh, Seymour, Ind.....	1 50
Five clusters, any kind, C. P. Bradley, South Bend, Ind.....	2 00
Second premium, H. H. Swalm, South Bend, Ind.....	1 00
Collection, by exhibitor, C. P. Bradley, South Bend, Ind.....	10 00
Second premium, C. A. Saltmarsh, Seymour, Ind.....	5 00
Plate Worden, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, H. H. Swalm, South Bend, Ind.....	1 00
Plate Concord, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Wilder, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Duchess, Sylvester Johnson, Irvington, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Brighton, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Salem, Sylvester Johnson, Irvington, Ind.....	1 00
Plate Lindley, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, W. B. Hick, Lawrence, Ind.....	1 00
Plate Pocklington, H. H. Swalm, South Bend, Ind.....	1 50
Plate Niagara, C. A. Saltmarsh, Seymour, Ind.....	1 50
Second premium, C. A. Saltmarsh, Seymour, Ind.....	1 00
Plate Diamond, H. H. Swalm, South Bend, Ind.....	1 50
Second premium, C. A. Saltmarsh, Seymour, Ind.....	1 00
Plate Vergennes, C. P. Bradley, South Bend, Ind.....	1 00
Plate Delaware, C. P. Bradley, South Bend, Ind.....	1 50
Plate Agawan, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, C. A. Saltmarsh, Seymour, Ind.....	1 00
Plate Catawba, Sylvester Johnson, Irvington, Ind.....	1 50
Second premium, H. H. Swalm, South Bend, Ind.....	1 00
Plate Poughkeepsie Red, Sylvester Johnson, Irvington, Ind.....	1 50
Plate Ulster Prolific, Sylvester Johnson, Irvington, Ind.....	1 50
Plate Ives, C. P. Bradley, South Bend, Ind.....	1 50
Plate Carman, Sylvester Johnson, Irvington, Ind.....	1 50
Plate Woodruff Red, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, C. A. Saltmarsh, Seymour, Ind.....	1 00
Plate Wyoming Red, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, Sylvester Johnson, Irvington, Ind.....	1 00
Plate Johnson, Sylvester Johnson, Irvington, Ind.....	1 50
Plate Empire State, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate hot-house grapes, Sylvester Johnson, Irvington, Ind.....	1 50
Plate seedlings, not named, Sylvester Johnson, Irvington, Ind....	1 50
Second premium, C. A. Saltmarsh, Seymour, Ind.....	1 00

MISCELLANEOUS.

Plate persimmons, John Tilson, Franklin, Ind.....	1 00
Second premium, H. M. Stout, Trafalgar, Ind.....	50
Plate pawpaws, Evan B. Davis, Cartersburg, Ind.....	1 00
Second premium, Robert Hindman, Lawrence, Ind.....	50

SWEEPSTAKES.

Display of fruits by Indiana county society, H. H. Swaim, South Bend, Ind	50 00
Second premium, B. F. Cole, Trafalgar, Ind.....	40 00
Third premium, H. C. Weaver, Shelbyville, Ind.....	30 00
Fourth premium, John W. Moorehouse, Albion, Ind.....	20 00

FLOWERS.

CLASS XLII—Plants.

(F. W. Beach, Judge, Richmond, Ind.)

Ten palms, Wiegand & Son, Indianapolis, Ind.....	\$10 00
Twenty ferns and lycopodiums, second premium, Wiegand & Son, Indianapolis, Ind	10 00
Ten crotons, Wiegand & Son, Indianapolis, Ind.....	7 00
Twenty variegated show plants, Wiegand & Son, Indianapolis, Ind	10 00
Ten blooming begonias, Baur & Smith, Indianapolis, Ind.....	6 00
Second premium, Cora B. Edmunds, Indianapolis, Ind.....	4 00
Ten foliage begonias, Baur & Smith, Indianapolis, Ind.....	7 00
Second premium, Cora B. Edmunds, Indianapolis, Ind.....	4 00
Six geraniums in bloom, Wiegand & Son, Indianapolis, Ind.....	4 00
Two vases filled, either iron, rustic or wire, Wiegand & Son, Indianapolis, Ind	8 00

SPECIAL.

Display of show plants, Wiegand & Son, Indianapolis, Ind.....	35 00
Second premium, Baur & Smith, Indianapolis, Ind.....	25 00
Two floral arrangements, John Rieman, Indianapolis, Ind.....	25 00
Two baskets, John Rieman, Indianapolis, Ind.....	15 00
Three bouquets, John Rieman, Indianapolis, Ind.....	10 00
Collection cut roses, W. W. Coles, Kokomo, Ind.....	10 00
Collection cut flowers, W. W. Coles, Kokomo, Ind.....	15 00

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Collection dahlias, W. W. Coles, Kokomo, Ind.....	5 00
Collection cut gladioli, W. W. Coles, Kokomo, Ind.....	15 00
Original show arrangement, Wm. Billingsley, Indianapolis, Ind..	50 00
Second premium, John Rieman, Indianapolis, Ind.....	35 00
Original wedding or reception arrangement, John Rieman, Indianapolis, Ind	25 00

CLASS XLIII—Amateur.

Collection begonias, Cora B. Edmunds, Indianapolis, Ind.....	5 00
Second premium, Mrs. W. B. Flick, Lawrence, Ind.....	3 00
Collection asters in bloom, Mrs. W. B. Flick, Lawrence, Ind.....	4 00
Three hanging baskets, Mrs. W. B. Flick, Lawrence, Ind.....	3 00

CUT FLOWERS.

Collection geraniums, Jesse Bennett, Greensburg, Ind.....	3 00
Second premium, Mrs. P. D. Stagg, Greensburg, Ind.....	2 00
Collection roses, Mrs. P. D. Stagg, Greensburg, Ind.....	4 00
Second premium, Jesse Bennett, Greensburg, Ind.....	2 00
Collection verbenas, Mrs. P. D. Stagg, Greensburg, Ind.....	3 00
Second premium, Mrs. W. B. Flick, Lawrence, Ind.....	2 00
Collection dahlias, Mrs. W. B. Flick, Lawrence, Ind.....	3 00
Second premium, Mrs. P. D. Stagg, Greensburg, Ind.....	2 00
Collection gladiolus, Mrs. W. B. Flick, Lawrence, Ind.....	3 00
Second premium, Mrs. P. D. Stagg, Greensburg, Ind.....	2 00
Design cut flowers, Mrs. P. D. Stagg, Greensburg, Ind.....	8 00
Second premium, Mrs. W. B. Flick, Lawrence, Ind.....	4 00
Twelve carnations, Mrs. W. B. Flick, Lawrence, Ind.....	3 00
Second premium, Mrs. P. D. Stagg, Greensburg, Ind.....	2 00
Two bouquets, flat or round, Mrs. W. B. Flick, Lawrence, Ind....	4 00

DEPARTMENT K.—BEES AND HONEY.

CLASS XLIV.

(E. H. Collins, Judge, Carmel, Ind.)

Specimen comb honey, Walter S. Poulder, Indianapolis, Ind.....	\$12 00
Second premium, Geo. M. Rumler, Mohawk, Ind.....	6 00
Extracted honey, Geo. M. Rumler, Mohawk, Ind.....	12 00
Second premium, Walter S. Poulder, Indianapolis, Ind.....	6 00

Beeswax, Walter S. Pouder, Indianapolis, Ind.....	2 00
Second premium, Geo. M. Rumler, Mohawk, Ind.....	1 00
Italian bees, Walter S. Pouder, Indianapolis, Ind.....	5 00
Second premium, Geo. M. Rumler, Mohawk, Ind.....	3 00
Italian queen bee, Walter S. Pouder, Indianapolis, Ind.....	5 00
Second premium, Geo. M. Rumler, Mohawk, Ind.....	3 00
Honey vinegar, Geo. M. Rumler, Mohawk, Ind.....	2 00
Second premium, Walter S. Pouder, Indianapolis, Ind.....	1 00
Aplarian supplies, collection, G. B. Lewis & Co., Indianapolis, Ind.	10 00
Second premium, Walter S. Pouder, Indianapolis, Ind.....	5 00
Display of honey, the product of one aplary, the arrangement and decoration of display to be considered, Geo. M. Rumler, Mo- hawk, Ind	15 00
Second premium, Walter S. Pouder, Indianapolis, Ind.....	8 00

CLASS XLV—Table Luxuries.

(Mrs. Blanche Draper, Judge, Ligonier, Ind.)

Home made cheese, Mrs. John B. Powers, Indianapolis, Ind.....	\$1 50
Second premium, N. A. Ford, Indianapolis, Ind.....	75
Fancy cheese, N. A. Ford, Indianapolis, Ind.....	1 50
Second premium, Mrs. J. B. Powers, Indianapolis, Ind.....	75
Maple syrup in most marketable shape, Geo. M. Rumler, Mohawk, Ind	2 00
Second premium, Mrs. J. H. Stucker, Indianapolis, Ind.....	1 00
Maple sugar, Mrs. P. D. Staggs, Greensburg, Ind.....	2 00
Second premium, Jesse Bennett, Greensburg, Ind.....	1 00
Bread, wheat, yeast, Mrs. E. T. Drake, Edinburg, Ind.....	1 50
Second premium, Mrs. W. S. Hoss, Indianapolis, Ind.....	75
Bread, wheat, salt-rising, Mrs. E. T. Drake, Edinburg, Ind.....	1 50
Second premium, Jennie Drake, Beech Grove, Ind.....	75
Graham bread, yeast, Mrs. John B. Powers, Indianapolis, Ind....	1 50
Second premium, Mrs. Vinna Robison, Franklin, Ind.....	75
Boston brown bread, Mary Faught, Indianapolis, Ind.....	1 50
Second premium, Mrs. Vinna Robison, Franklin, Ind.....	75
Rusk, Helen Kellerher, Broad Ripple, Ind.....	1 50
Second premium, Mrs. J. M. Porter, Indianapolis, Ind.....	75
Corn gems, Mrs. C. E. Hollingsworth, Indianapolis, Ind.....	1 50
Second premium, Mrs. Betty Clore, Bargserville, Ind.....	75
Dozen rolls, Mrs. W. S. Hoss, Indianapolis, Ind.....	1 50
Second remium, A. J. Voris, Indianapolis, Ind.....	75
Ginger bread, Mary Faught, Indianapolis, Ind.....	1 50
Second premium, Mrs. J. B. Powers, Indianapolis, Ind.....	75
Ginger cookies, Mrs. Vinna Robison, Franklin, Ind.....	1 00

Second premium, A. J. Voris, Indianapolis, Ind.....	50
Fig cake, Mrs. V. L. Wilson, Connersville, Ind.....	1 50
Second premium, Mrs. O. C. McGammon, Indianapolis, Ind.....	75
Layer cake, caramel, orange, Mary Faught, Indianapolis, Ind....	1 50
Second premium, Mrs. O. C. McGammon, Indianapolis, Ind.....	75
Layer cake, caramel, chocolate, Mary Faught, Indianapolis, Ind..	1 50
Second premium, Mrs. Jerome Dunlap, Lafayette, Ind.....	75
Marble loaf cake, Elinor B. Ford, Indianapolis, Ind.....	1 50
Second premium, Mrs. John H. Schulte, Indianapolis Ind.....	75
White mountain cake, Mrs. V. L. Wilson, Connersville, Ind.....	1 50
Second premium, Mrs. O. C. McGammon, Indianapolis, Ind.....	75
Cocanut cake, Mrs. T. A. Randall, Indianapolis, Ind.....	1 50
Second premium, Mrs. V. L. Wilson, Connersville, Ind.....	75
Sunshine cake, Mrs. O. C. McGammon, Indianapolis, Ind.....	1 50
Second premium, Mrs. C. D. Auglinbaugh, Indianapolis, Ind.....	75
Angels' food, Daisy Davenport, Indianapolis, Ind.....	1 50
Second premium, Myrtle Pressly, Lawrence, Ind.....	75
Hicorynut cake, loaf, A. J. Voris, Indianapolis, Ind.....	1 50
Second premium, Mrs. O. C. McGammon, Indianapolis, Ind.....	75
Hickorynut cake, layer, Mrs. V. L. Wilson, Connersville, Ind....	1 50
Second premium, Mrs. O. C. McGammon, Indianapolis Ind.....	75
Fruit cake, Mrs. W. S. Hoss, Indianapolis, Ind.....	3 00
Second premium, Myrtle Pickle, McCordsville, Ind.....	2 00
White fruit cake, Mrs. V. L. Wilson, Connersville, Ind.....	1 50
Second premium, Mrs. O. C. McGammon, Indianapolis, Ind.....	75
White cake, Mrs. Laura Childers, Indianapolis, Ind.....	1 50
Second premium, Mrs. V. L. Wilson, Connersville, Ind.....	75
Chocolate cake, layer, Alice V. Hatton, Indianapolis, Ind.....	1 50
Second premium, Mrs. J. M. Porter, Indianapolis, Ind.....	75
Chocolate cake, loaf, Mrs. O. C. McGammon, Indianapolis, Ind....	1 50
Second premium, Mrs. Jerome Dunlap, Lafayette, Ind.....	75
Crullers, Helen Kellerher, Broad Ripple, Ind.....	1 50
Second premium, Mrs. V. L. Wilson, Connersville, Ind.....	75
Cream puff, Mary Faught, Indianapolis, Ind.....	1 50
Second premium, Mrs. John B. Powers, Indianapolis, Ind.....	75
Cookies, Otis C. Hann, Indianapolis, Ind.....	1 50
Second premium, Mrs. Betty Clore, Bargersville, Ind.....	75
Kisses, Helen Kellerher, Broad Ripple, Ind.....	1 50
Second premium, Mrs. John B. Powers, Indianapolis, Ind.....	75
Meringues, Miss Mary Ford, Indianapolis, Ind.....	1 50
Second premium, Mrs. J. B. Powers, Indianapolis, Ind.....	75
Cheese straws, A. J. Voris, Indianapolis, Ind.....	1 00
Second premium, Mrs. John B. Powers, Indianapolis, Ind.....	50
Saratoga chips, Chas. W. Parlsoe, Indianapolis, Ind.....	1 00
Second premium, A. J. Voris, Indianapolis, Ind.....	50

Spiced peaches, W. F. Tracy, Rising Sun, Ind.....	1 00
Second premium, Mrs. V. L. Wilson, Connersville, Ind.....	50
Spiced pears, Mrs. W. S. Hoss, Indianapolis, Ind.....	1 00
Second premium, Mrs. Fremont Eastes, Mt. Comfort, Ind.....	50
Spiced cherries, Mrs. John B. Powers, Indianapolis, Ind.....	1 00
Second premium, Mrs. Betty Clore, Bargersville, Ind.....	50
Sweet pickles, collection, Mrs. Fremont Eastes, Mt. Comfort, Ind..	4 00
Second premium, Mrs. Beatty Clore, Bargersville, Ind.....	2 00
Pickles, mixed, Jennie Drake, Beech Grove, Ind.....	1 50
Second premium, Mrs. John Groseclose, Indianapolis, Ind.....	75
Pickles, cucumber, Mrs. J. M. Porter, Indianapolis, Ind.....	1 50
Second premium, Mrs. W. S. Hoss, Indianapolis, Ind.....	75
Peach pickles, W. F. Tracy, Rising Sun, Ind.....	1 50
Second premium, Mrs. Betty Clore, Bargersville, Ind.....	75
Pear pickles, Mrs. Fremont Eastes, Mt. Comfort, Ind.....	1 50
Second premium, W. F. Tracy, Rising Sun, Ind.....	75
Tomato catsup, Mrs. Betty Clore, Bargersville, Ind.....	1 00
Second premium, Mrs. J. M. Porter, Indianapolis, Ind.....	50
Cucumber catsup, Mrs. W. S. Hoss, Indianapolis, Ind.....	1 00
Second premium, Otis C. Hann, Indianapolis, Ind.....	50
Chili sauce, Mrs. J. M. Porter, Indianapolis, Ind.....	1 00
Second premium, Otis C. Hann, Indianapolis, Ind.....	50
Boston baked beans, Mrs. T. A. Randall, Indianapolis, Ind.....	1 00
Second premium, Mary Faught, Indianapolis, Ind.....	50
Gelatine dessert, any form, A. J. Voris, Indianapolis, Ind.....	1 50
Second premium, N. A. Ford, Indianapolis, Ind.....	75
Collection French candies, Mrs. John B. Powers, Indianapolis, Ind.	1 50
Second premium, N. A. Ford, Indianapolis, Ind.....	75
Collection taffies, Mrs. John B. Powers, Indianapolis, Ind.....	1 50
Second premium, N. A. Ford, Indianapolis, Ind.....	75
Jellies, collection, Mrs. V. L. Wilson, Connersville, Ind.....	3 00
Second premium, Mrs. Fremont Eastes, Mt. Comfort, Ind.....	2 00
Preserves, collection, Mrs. Fremont Eastes, Mt. Comfort, Ind....	3 00
Second premium, Jennie Drake, Beech Grove, Ind.....	2 00
Fruit butters, collection, Mrs. Fremont Eastes, Mt. Comfort, Ind..	4 00
Second premium, Mrs. Betty Clore, Bargersville, Ind.....	2 00
Canned fruit, collection, Mrs. Fremont Eastes, Mt. Comfort, Ind..	5 00
Second premium, Mrs. V. L. Wilson, Connersville, Ind.....	3 00

PROFESSIONAL COOKING.

Collection cakes, N. A. Ford, Indianapolis, Ind.....	2 50
Second premium, Mrs. Vinna Robison, Franklin, Ind.....	1 25
Collection candies, Alice Matthews, Greenwood, Ind.....	2 00
Second premium, Mrs. Vinna Robison, Franklin, Ind.....	1 00

Fanciest gelatine dessert, Alice Matthews, Greenwood, Ind.	2 00
Second premium, Miss Mary Ford, Indianapolis, Ind.	1 00
Fancy bread, Miss Mary Ford, Indianapolis, Ind.	1 50
Second premium, Alice Matthews, Greenwood, Ind.	75
Fancy dessert, Miss Mary Ford, Indianapolis, Ind.	1 00
Second premium, Alice Matthews, Greenwood, Ind.	50
Fancy relish, Miss Mary Ford, Indianapolis, Ind.	1 00
Second premium, Alice Matthews, Greenwood, Ind.	50

DEPARTMENT L.—ART.

CLASS XLVI—Knitting and Crochet Work.

(Mrs. Frederick Baggs, Judge, Indianapolis.)

Infant's shirt, Mrs. Madge Waggaman, Kokomo, Ind.	\$1 50
Second premium, Miss Susan Read, Indianapolis, Ind.	75
Infant's socks, display, Mrs. M. A. Payne, Palmyra, Mo.	1 50
Second premium, Alice M. Kline, Crawfordsville, Ind.	75
Pair silk mittens, hand knit, Anna Miller, Indianapolis, Ind.	1 50
Second premium, Mrs. M. A. Payne, Palmyra, Mo.	75
Pair silk stockings, hand knit, Mrs. M. A. Payne, Palmyra, Mo.	2 00
Second premium, Mrs. L. E. Rockwell, Quincy, Ill.	1 00
Infant's crochet sacque, Mrs. Madge Waggaman, Kokomo, Ind. ...	1 50
Second premium, Mrs. H. D. Field, Greensburg, Ind.	75
Couch cover, Mrs. L. E. Rockwell, Quincy, Ill.	2 00
Second premium, Mrs. E. W. Bennson, Hamilton, O.	1 00
Crochet shirt, Mrs. L. E. Rockwell, Quincy, Ill.	2 00
Second premium, Anna Miller, Indianapolis, Ind.	1 00
Silk purse, Mrs. Wm. H. Welch, Indianapolis, Ind.	1 00
Second premium, Elinor B. Ford, Indianapolis, Ind.	50
Crochet bedspread, Mrs. L. E. Rockwell, Quincy, Ill.	2 00
Second premium, Mrs. Mary Eilhard, Indianapolis, Ind.	1 00
Infant's silk cap, Mrs. L. E. Rockwell, Quincy, Ill.	1 50
Second premium, Mrs. C. Dille, Greensburg, Ind.	75

CLASS XLVII—Lace Work.

Battenburg lace, specimen, Mrs. L. A. Moore, Terre Haute, Ind. .	\$1 50
Second premium, Bella C. Hyson, Columbus, O.	1 00
Battenburg lace, dresser scarf, Anna Miller, Indianapolis, Ind. ...	1 50

Second premium, Mrs. C. Dille, Greensburg, Ind.....	1 00
Battenberg lace table cover, Miss Effie Bradway, Indianapolis, Ind	1 50
Second premium, Mrs. C. Dille, Greensburg, Ind.....	1 00
Battenberg lace center piece, Miss Susan Read, Indianapolis, Ind.	1 50
Second premium, Alice M. Kline, Crawfordsville, Ind.....	1 00
Battenberg lace, sideboard scarf, second premium, Mrs. C. Dille, Greensburg, Ind	1 00
Battenberg lace, display of five pieces, Alice M. Kline, Crawfords- ville, Ind	2 00
Second premium, Mrs. C. Dille, Greensburg, Ind.....	1 00
Point lace display, H. M. Goodwin, New Castle, Ind.....	3 00
Second premium, Flora V. Greenstreet, Indianapolis, Ind.....	1 50
Point lace specimen, Mrs. Earl O. Matlock, Indianapolis, Ind.....	2 00
Second premium, Mrs. C. Dille, Greensburg, Ind.....	1 00
Point lace handkerchief, Mrs. M. A. Payne, Palmyra, Mo.....	2 00
Second premium, Mrs. Earl O. Matlock, Indianapolis, Ind.....	1 00

CLASS XLVIII—Embroidery. Hand Made.

(Anna C. Hobbs, Judge, Salem, Ind.)

Delft, Mrs. L. A. Moore, Terre Haute, Ind.....	\$2 00
Second premium, Mrs. R. H. Talbott, Lexington, Ky.....	1 00
Jewell, Mrs. R. H. Talbott, Lexington, Ky.....	2 00
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	1 00
Iridescent, Mrs. L. A. Moore, Terre Haute, Ind.....	2 00
Second premium, Anna Miller, Indianapolis, Ind.....	1 00
Honitan, Mrs. L. A. Moore, Terre Haute, Ind.....	2 00
Second premium, Mrs. G. R. Wysong, Indianapolis, Ind.....	1 00
Cotton, Mrs. P. D. Stagg, Greensburg, Ind.....	2 00
Second premium, Mrs. C. Dille, Greensburg, Ind.....	1 00
Kensington, Mrs. Frank Swain, Indianapolis, Ind.....	2 00
Second premium, Bella C. Hyson, Columbus, O.....	1 00
Rope silk, L. I. Murray, Huntington, Ind.....	2 00
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	1 00
Roman, L. I. Murray, Huntington, Ind.....	2 00
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	1 00
Outline, Mrs. R. H. Talbott, Lexington, Ky.....	1 50
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	75
Embroidery, bolting cloth, Mrs. D. P. Stagg, Greensburg, Ind..	2 00
Second premium, Mrs. Geo. Sands, Kokomo, Ind.....	1 00
Embroidery, chamols cloth, Alice M. Kline, Crawfordsville, Ind..	2 00
Second premium, Mrs. D. P. Stagg, Greensburg, Ind.....	1 00
Queene Anne darning, H. M. Allison, Indianapolis, Ind.....	2 00

Second premium, Mrs. M. A. Payne, Palmyra, Mo.....	1 00
Denim, specimen, Elinor B. Ford, Indianapolis, Ind.....	1 50
Second premium, Mrs. Madge Waggaman, Kokomo, Ind.....	75
Basket of molle cloth, Anna Miller, Indianapolis, Ind.....	1 50
Tinting and embroidery, Mrs. R. L. Hurlburt, Indianapolis, Ind...	1 50
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	75
Lunch set, Bella C. Hyson, Columbus, O.....	3 00
Second premium, Anna Miller, Indianapolis, Ind.....	2 00
Dolley set, Mrs. R. H. Talbott, Lexington, Ky.....	2 00
Second premium, Mrs. J. J. Garver, Indianapolis, Ind.....	1 00
Linen table cloth and six napkins, Mrs. C. Dille, Greensburg, Ind	4 00
Second premium, L. I. Murray, Huntington, Ind.....	3 00
Hostess cloth, Mrs. R. H. Talbott, Lexington, Ky.....	2 00
Second premium, Bella C. Hyson, Columbus, O.....	1 00
Tray cloth, Mrs. R. H. Talbott, Lexington, Ky.....	1 50
Second premium, Bella C. Hyson, Columbus, O.....	75
Skirt, silk embroidery, L. I. Murray, Huntington, Ind.....	2 00
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	1 00
Infant's shawl, silk embroidery, Mrs. H. D. Field, Greensburg, Ind	2 00
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	1 00
Infant's cap, silk embroidery, Anna Miller, Indianapolis, Ind.....	1 50
Second premium, Mrs. C. Dille, Greensburg, Ind.....	75
Sideboard scarf, Mrs. R. H. Talbott, Lexington, Ky.....	2 00
Second premium, Mary V. Smucher, Newark, O.....	1 00
Dresser furnishings, Mrs. L. A. Moore, Terre Haute, Ind.....	2 00
Second premium, Mrs. Madge Waggaman, Kokomo, Ind.....	1 00
Couch pillow, Mrs. Geo. Sands, Kokomo, Ind.....	2 00
Second premium, Cuba Reagen, Indianapolis, Ind.....	1 00
Toilet cushion, new style, Mrs. Madge Waggaman, Kokomo, Ind..	3 00
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	2 00
Table cover, Alice M. Kline, Crawfordsville, Ind.....	3 00
Second premium, Mrs. C. Dille, Greensburg, Ind.....	2 00
Table center, embroidered, Mrs. J. J. Garver, Indianapolis, Ind...	2 00
Second premium, Alice M. Kline, Crawfordsville, Ind.....	1 00
Handkerchief case, Mrs. C. Dille, Greensburg, Ind.....	1 50
Second premium, Mary J. Lynch, Kokomo, Ind.....	75
Glove case, Bella C. Hyson, Columbus, O.....	1 50
Second premium, L. I. Murray, Huntington, Ind.....	75
Picture frame, embroidered, Mrs. L. A. Moore, Terre Haute, Ind..	1 50
Second premium, Mrs. Geo. Sands, Kokomo, Ind.....	75
Bulgarian work, Anna Miller, Indianapolis, Ind.....	1 50
Second premium, Miss Susan Read, Indianapolis, Ind.....	75

CLASS XLIX—Sewing, Machine and Hand.

Display of ladies' underwear, Mrs. D. P. Stagg, Greensburg, Ind..	\$3 00
Second premium, Mary J. Lynch, Kokomo, Ind.....	1 50
Hemstitching, machine, Mrs. Madge Waggaman, Kokomo, Ind...	1 50
Second premium	
Ladies tea jacket, Mrs. Geo. Sands, Kokomo, Ind.....	2 00

HAND WORK.

Hemstitching, specimen, H. M. Goodwin, New Castle, Ind.....	2 00
Second premium, Anna Miller, Indianapolis, Ind.....	1 00
Hemstitching silk, not handkerchief, Mary Faught, Indianapolis, Ind	2 00
Second premium, Mrs. E. W. Bennson, Hamilton, O.....	1 00
Hemstitching linen, not handkerchief, Miss Susan Read, Indian- apolis, Ind.....	2 00
Second premium, Mrs. E. W. Bennson, Hamilton, O.....	1 00
Drawn work, Mexican, Anna Miller, Indianapolis, Ind.....	2 00
Second premium, Mrs. C. Dille, Greensburg, Ind.....	1 00
Infant's outfit, Mrs. H. D. Field, Greensburg, Ind.....	4 00
Second premium, Mrs. C. Dille, Greensburg, Ind.....	2 00
Ladies' white skirt, Mary J. Lynch, Kokomp, Ind.....	3 00
Second premium, Mrs. Madge Waggaman, Kokomo, Ind.....	
Lunch set, drawn work, Anna Miller, Indianaolis, Ind.....	2 00
Second premium, Mrs. S. S. Johnson, Indianapolis, Ind.....	1 00

CLASS L—Ladies' Fancy Work.

(Jennie M. Watson, Judge, Marion, Ind.)

Couch pillow, Mrs. Maude Everett, Indianapolis, Ind.....	\$1 50
Second premium, Mrs. Madge Waggaman, Kokomo, Ind.....	75
Infant's nursery basket, Mrs. C. Dille, Greensburg, Ind.....	2 00
Second premium, Mrs. Chas. Nye, Indianapolis, Ind.....	1 00
Infant's afgan, embroidered, Mrs. C. Dille, Greensburg, Ind.....	1 50
Second premium, Anna Miller, Indianapolis, Ind.....	75
Book cover, linen, A. V. Stickler, Indianapolis, Ind.....	1 50
Lunch set, Anna Miller, Indianapolis, Ind.....	2 00
Second premium, Mrs. C. F. Hunt, Indianapolis, Ind.....	1 00
Dollies, not embroidered, Mrs. J. Garver, Indianapolis, Ind.....	1 50
Second premium, Mrs. Geo. Sands, Kokomo, Ind.....	75
Shopping bag, Mary J. Lynch, Kokomo, Ind.....	1 50
Second premium, Mrs. Madge Waggaman, Kokomo, Ind.....	75
Fancy apron, Mrs. H. D. Field, Greensburg, Ind.....	75

Second premium, Mary J. Lynch, Kokomo, Ind.....	75
Kitchen apron, Mary L. Fox, Indianapolis, Ind.....	1 50
Second premium, Mary J. Lynch, Kokomo, Ind.....	75
Table cover, drawn work, Mrs. Madge Waggaman, Kokomo, Ind..	1 50
Second premium, Anna Miller, Indianapolis, Ind.....	75
Table center, drawn work, Mrs. Geo. Sands, Kokomo, Ind.....	75
Second premium, Mrs. S. S. Johnson, Indianapolis, Ind.....	75
Fancy opera bag, Mrs. Madge Waggaman, Kokomo, Ind.....	1 50
Second premium, Mary L. Fox, Indianapolis, Ind.....	75
Laundry bag, Mrs. Geo. Sands, Kokomo, Ind.....	1 50
Second premium, Bella C. Hyson, Columbus, O.....	75
Quilt, silk, needle work, Mrs. L. E. Rockwell, Quincy, Ill.....	3 00
Second premium, Mrs. M. M. Keisher, Indianapolis, Ind.....	2 00

CLASS LI—Photography.

(Adam Heimberger, Judge.)

Display pictures 3½x3½, Alice M. Kline, Crawfordsville, Ind.....	\$3 00
Second premium, Ruth Patterson, Indianapolis, Ind.....	2 00
Display pictures 3¼x4¼, Ben. W. Douglass, Indianapolis, Ind.....	3 00
Display pictures 4x5, Ben. W. Douglass, Indianapolis, Ind.....	3 00
Second premium, Frank Walters, Indianapolis, Ind.....	2 00
Display pictures 4¼x¼, Ethel R. Claybourne, Indianapolis, Ind..	3 00
Second premium, Ben. W. Douglass, Indianapolis, Ind.....	2 00
Display pictures 5x7, Nellie Coutant, Crawfordsville, Ind.....	3 00
Second premium, John Woche, Indianapolis, Ind.....	2 00
Display pictures 6½x8½, Alice M. Kline, Crawfordsville, Ind.....	3 00
Second premium, Chas. A. Heron, Indianapolis, Ind.....	2 00
Best specimen 3½x3½, Nellie Coutant, Crawfordsville, Ind.....	1 50
Second premium, Ruth Patterson, Indianapolis, Ind.....	75
Best specimen 3¼x4¼, Ben. W. Douglass, Indianapolis, Ind.....	1 50
Second premium. No premium awarded.	
Best specimen 4x5, Alice M. Kline, Crawfordsville, Ind.....	1 50
Second premium, Clyde M. Bower, Malott Park, Ind.....	75
Best specimen 4¼x4¼, Ben. W. Douglas, Indianapolis, Ind.....	1 50
Second premium, Ethel R. Olaybourne, Indianapolis, Ind.....	75
Best specimen 5x7, Nellie Coutant, Crawfordsville, Ind.....	1 50
Second premium, John Woche, Indianapolis, Ind.....	75
Best specimen 6½x8½, Alice M. Kline, Crawfordsville, Ind.....	1 50
Second premium, Nellie Coutant, Crawfordsville, Ind.....	75

CLASS LXII—Decorative Art Work.

(Mrs. Sam Carr, Judge, Indianapolis.)

Moulding in clay, Maude Myers, Columbus, O.....	\$5 00
Second premium, Mrs. A. Hoyt, Indianapolis, Ind.....	2 00
Carved or incision work on raw clay. No premium awarded.	
Bas relief, H. M. Goodwin, New Castle, Ind.....	4 00
Second premium, Mrs. Marie Folger, Indianapolis, Ind.....	2 00
Wood carving, display, H. M. Goodwin, New Castle, Ind.....	8 00
Second premium. No premium awarded.	
Wood carving, specimen, Mrs. Madge Waggaman, Kokomo, Ind..	2 00
Tapestry painting, Minnie B. Akass, Chicago, Ill.....	6 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	4 00
Painted menu card, Mrs. O. C. Wilcox, Indianapolis, Ind.....	2 00
Second premium, Mrs. Marie Folger, Indianapolis, Ind.....	1 00
Blotting pad, Mrs. J. J. Garver, Indianapolis, Ind.....	1 00
Second premium, Mrs. J. J. Garver, Indianapolis, Ind.....	75
Calendar, Mrs. June Ritchey, Muncie, Ind.....	1 00
Second premium, Minnie B. Akass, Chicago, Ill.....	75
Letter case, Mrs. W. S. Day, Indianapolis, Ind.....	1 00
Second premium, Nellie I. Julian, Indianapolis, Ind.....	75
Best bon bon, Harlet A. Van Horn, Indianapolis, Ind.....	3 00
Second premium, Mrs. J. J. Garver, Indianapolis, Ind.....	2 00
Decorated tray, Mrs. O. C. Wilcox, Indianapolis, Ind.....	2 00
Second premium, Mrs. Wm. H. Welch, Indianapolis, Ind.....	1 00

CLASS LXIII—Art Work, Paintings and Drawings—Amateur.

(Mrs. F. M. Williamson, Judge, Logansport, Ind.)

Portrait in oil, from life, Minnie B. Akass, Chicago, Ill.....	\$6 00
Second premium, Minnie B. Akass, Chicago, Ill.....	3 00
Portrait in crayon, from life, Minnie B. Akass, Chicago, Ill.....	4 00
Second premium, Mrs. June Ritchey, Muncie, Ind.....	2 00
Portrait in pastel, from life, Minnie B. Akass, Chicago, Ill.....	4 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Portrait in water colors, from life, Minnie B. Akass, Chicago, Ill..	6 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	3 00
Ideal head, oil, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Ideal head, crayon, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Ideal head, water colors, Mrs. Clinton Hall, Indianapolis, Ind....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00

Ideal head, pastel, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Group figure, in oil, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Ideal figure in crayon, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Group figure, in water colors, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Ideal figure, pastel, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen, flowers, in oil, Mrs. Clinton Hall, Indianapolis, Ind...	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Display, flowers, in oil, Minnie B. Akass, Chicago, Ill.....	4 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Specimen, flowers, water color, Minnie B. Akass, Chicago, Ill....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Specimen, fruit, in oil, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Specimen, fruit, in water colors, Mrs. Clinton Hall, Indianapolis	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Specimen, vegetable, in oil, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen, vegetable, in water colors, Minnie B. Akass, Chicago..	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Display, fruit or vegetable, in oil, Minnie B. Akass, Chicago, Ill..	4 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Display, fruit or vegetable, in water colors, Minnie B. Akass, Chicago, Ill.....	4 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Specimen, animal, in oil, Mrs. Clinton Hall, Indianapolis, Ind....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Specimen, animal, water colors, Minnie B. Akass, Chicago, Ill....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen, game, in oil, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen, game, in water colors, Minnie B. Akass, Chicago, Ill..	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen, game, in pastel, Mrs. Clinton Hall, Indianapolis, Ind..	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Specimen, still life, in oil, Mrs. Clinton Hall, Indianapolis, Ind....	2 00
Second premium, Maude Myers, Columbus, O.....	1 00
Specimen, still life, water colors, Mrs. Clinton Hall, Indianapolis	2 00
Second premium, Lavina Austin, Crawfordsville, Ind.....	1 00
Specimen, still life, pastel, Mrs. Clinton Hall, Indianapolis, Ind..	2 00
Second premium, Lavina Austin, Crawfordsville, Ind.....	1 00

Specimen, still life, crayon, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen, landscape, oil, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen, landscape, water colors, Minnie B. Akass, Chicago, Ill..	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Specimen, landscape, pastel, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Specimen, landscape, pastel, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen, landscape, crayon, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Display, landscape paintings, Minnie B. Akass, Chicago, Ill.....	8 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	4 00
Summer scene, in oil, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Summer scene, water colors, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Autumn scene, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Autumn scene, water colors, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Winter scene, oil, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Winter scene, water colors, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Marine scene, oil, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Marine scene, water colors, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Interior scene, oil, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Interior scene, water colors, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen, pencil, drawing, Minnie B. Akass, Chicago, Ill.....	1 00
Second premium, Minnie B. Akass, Chicago, Ill.....	75
Specimen, pen and ink sketch, Mrs. Clinton Hall, Indianapolis..	1 00
Second premium, F. T. Haywood, Indianapolis, Ind.....	75
Display, pen and ink sketch, Mrs. Clinton Hall, Indianapolis, Ind.	4 00
Second premium, G. T. Haywood, Indianapolis, Ind.....	2 00
Specimen, drawing, copy, Minnie B. Akass, Chicago, Ill.....	1 00
Second premium, Minnie B. Akass, Chicago, Ill.....	75
Specimen, drawing, original, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Drawing architectural, original. No premium awarded.	

Drawing, mechanical, Ethel R. Claybourne, Indianapolis, Ind.....	2 00
Second premium, Ethel R. Claybourne, Indianapolis, Ind.....	1 00
Drawing, charcoal, from antique, Maude Myers, Columbus, O....	4 00
Drawing, charcoal, from life, Mrs. Clinton Hall, Indianapolis, Ind.	2 00
Second premium, Minnie B. Akass, Chicago, Ill.....	1 00
Original, illustrated popular poem, Minnie B. Akass, Chicago, Ill.	2 00
Second premium, Lavina Austin, Crawfordsville, Ind.....	1 00
Painting, monochrome, oil, Minnie B. Akass, Chicago, Ill.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Best entire exhibit, Minnie B. Akass, Chicago, Ill.....	10 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	5 00

CLASS XLIV—Art Work, Paintings and Drawings—Professional.

Portrait, in oil, Mrs. Marie Folger, Indianapolis, Ind.....	15 00
Second premium, G. V. Strauss, Crawfordsville, Ind.....	8 00
Portrait, in water colors, C. E. Spahr, Indianapolis, Ind.....	10 00
Second premium, May Greenlief, Indianapolis, Ind.....	5 00
Portrait, in crayon, C. E. Spahr, Indianapolis, Ind.....	6 00
Portrait, in pastel, Mrs. Marie Folger, Indianapolis, Ind.....	10 00
Second premium, C. E. Spahr, Indianapolis, Ind.....	5 00
Ideal head, in oil, C. E. Spahr, Indianapolis, Ind.....	6 00
Second premium, H. M. Goodwin, New Castle, Ind.....	3 00
Ideal head, water colors, C. E. Spahr, Indianapolis, Ind.....	4 00
Second premium, Grace Greenlief, Indianapolis, Ind.....	3 00
Ideal figure, oil, Mrs. Marie Folger, Indianapolis, Ind.....	6 00
Second premium, C. E. Spahr, Indianapolis, Ind.....	3 00
Group figure, oil, C. E. Spahr, Indianapolis, Ind.....	6 00
Ideal figure, water color, Mrs. W. Galpin, Indianapolis, Ind.....	4 00
Second premium, Caroline Nelson, Indianapolis, Ind.....	2 00
Group figure, water colors, C. E. Spahr, Indianapolis, Ind.....	4 00
Second premium, Grace Greenlief, Indianapolis, Ind.....	2 00
Specimen, flowers, in oil, C. E. Spahr, Indianapolis, Ind.....	4 00
Second premium, Mrs. Marie Folger, Indianapolis, Ind.....	2 00
Display, flowers, in oil, H. M. Goodwin, New Castle, Ind.....	6 00
Second premium. No premium awarded.	
Specimen, flowers, water colors, Myrtle L. Taylor, Indianapolis..	4 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00
Display, flowers, water colors, Myrtle L. Taylor, Indianapolis....	6 00
Second premium, Mrs. Marie Folger, Indianapolis, Ind.....	3 00
Specimen, fruit, in oil, Mrs. Marie Folger, Indianapolis, Ind.....	4 00
Second premium, C. E. Spahr, Indianapolis, Ind.....	2 00
Specimen, fruit, water colors, Mrs. Marie Folger, Indianapolis....	4 00
Second premium, G. V. Strauss, Crawfordsville, Ind.....	2 00

Specimen, vegetable, in oil, G. V. Strauss, Crawfordsville, Ind....	4 00
Second premium, G. V. Strauss, Crawfordsville, Ind.....	2 00
Specimen, vegetable, water color, G. V. Strauss, Crawfordsville...	4 00
Second premium, May Greenlief, Indianapolis, Ind.....	2 00
Display, fruit or vegetable, in oil. No premium awarded.	
Display, fruit or vegetable, water color, Mrs. W. P. Galpin, Indianapolis, Ind.....	6 00
Second premium, Myrtle L. Taylor, Indianapolis, Ind.....	3 00
Animal, in oil, Mrs. Marie Folger, Indianapolis, Ind.....	4 00
Second premium, C. E. Spahr, Indianapolis, Ind.....	3 00
Animal, in water colors, C. E. Spahr, Indianapolis, Ind.....	4 00
Second premium, Grace Greenlief, Indianapolis, Ind.....	2 00
Game, in oil, C. E. Spahr, Indianapolis, Ind.....	4 00
Second premium, Mrs. Marie Folger, Indianapolis, Ind.....	2 00
Game, in water colors, Mrs. Marie Folger, Indianapolis, Ind.....	4 00
Second premium, Mrs. Marie Folger, Indianapolis, Ind.....	2 00
Game, in pastel, Mrs. Marie Folger, Indianapolis, Ind.....	4 00
Still life, oil, Mrs. Marie Folger, Indianapolis, Ind.....	4 00
Second premium, Mrs. Marie Folger, Indianapolis, Ind.....	2 00
Still life, water color, G. V. Strauss, Crawfordsville, Ind.....	4 00
Second premium, G. V. Strauss, Crawfordsville, Ind.....	2 00
Still life, pastel, Mrs. Marie Folger, Indianapolis, Ind.....	4 00
Second premium, Grace Greenlief, Indianapolis, Ind.....	2 00
Still life, crayon, Marie E. Moran, Washington, D. C.....	4 00
Specimen, landscape, oil, Mrs. Marie Folger, Indianapolis, Ind...	4 00
Second premium, G. V. Strauss, Crawfordsville, Ind.....	2 00
Specimen, landscape, water colors, C. E. Spahr, Indianapolis, Ind.	4 00
Second premium, Mrs. Marie Folger, Indianapolis, Ind.....	2 00
Specimen, landscape, pastel, Mrs. Marie Folger, Indianapolis, Ind.	4 00
Second premium, H. M. Goodwin, New Castle, Ind.....	2 00
Landscape, crayon, Marie E. Moran, Washington, D. C.....	4 00
Second premium. No premium awarded.	
Display landscape, paintings, Mrs. Marie Folger, Indianapolis, Ind.	6 00
Second premium, C. E. Spahr, Indianapolis, Ind.....	3 00
Interior scene, oil, Marie Folger, Indianapolis, Ind.....	4 00
Second premium, C. E. Spahr, Indianapolis, Ind.....	2 00
Interior scene, water colors, C. E. Spahr, Indianapolis, Ind.....	4 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00
Drawing from antique head, C. E. Spahr, Indianapolis, Ind.....	4 00
Second premium, C. E. Spahr, Indianapolis, Ind.....	2 00
Drawing from antique figure, Helen M. Bennett, Indianapolis, Ind.	4 00
Second premium, C. E. Spahr, Indianapolis, Ind.....	2 00
Drawing, animal, C. E. Spahr, Indianapolis, Ind.....	4 00
Second premium, C. E. Spahr, Indianapolis, Ind.....	2 00
Drawing, mechanical, H. M. Goodwin, New Castle, Ind.....	4 00

ANNUAL MEETING.

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Second premium, H. M. Goodwin, New Castle, Ind.....	2 00
Pen and ink drawing, Caroline Wilson, Indianapolis, Ind.....	2 00
Second premium, Caroline Wilson, Indianapolis, Ind.....	1 00
Charcoal drawing, from life, H. M. Goodwin, New Castle, Ind....	3 00
Best entire exhibit, Mrs. Marie Folger, Indianapolis, Ind.....	12 00
Second premium, C. E. Spahr, Indianapolis, Ind.....	6 00

CLASS LV—Art Work, China—Amateur.

Painting on china, Dresden, Daisy Altland, Indianapolis, Ind....	2 00
Second premium, Mrs. Geo. Coughlin, Indianapolis, Ind.....	1 00
Painting on china, Persian, Flora V. Greenstreet, Indianapolis...	2 00
Second premium, Mrs. Willis Fulgate, Indianapolis, Ind.....	1 00
Painting on china, relief, Mrs. J. J. Garver, Indianapolis, Ind....	2 00
Second premium, Mrs. J. J. Garver, Indianapolis, Ind.....	1 00
Painting on china, enamel, Flora V. Greenstreet, Indianapolis, Ind.	2 00
Second premium, Flora V. Greenstreet, Indianapolis, Ind.....	1 00
Painting on china, punch bowl, fruit, Mrs. E. P. Thayer, Greenfield, Ind.....	4 00
Second premium, Mrs. Geo. Coughlin, Indianapolis, Ind.....	2 00
Painting on china, tankard, figure, Harriet A. Van Horn, Indianapolis, Ind.....	4 00
Second premium, Elinor B. Ford, Indianapolis, Ind.....	2 00
Painting on china, tankard, flowers Mrs. E. P. Thayer, Greenfield	4 00
Second premium, Mrs. Willis Fulgate, Indianapolis, Ind.....	2 00
Painting on china, tankard, fruit, Daisy Altland, Indianapolis, Ind.	4 00
Second premium, Elinor B. Ford, Indianapolis, Ind.....	2 00
Painting on china, claret pitcher, Mrs. Maude Everett, Indianapolis, Ind.....	4 00
Second premium, Harriet A. Van Horn, Indianapolis, Ind.....	2 00
Painting on china, jardiniere, figures. No premium awarded.	
Painting on china, jardiniere, flowers, Mrs. Geo. Coughlin, Indianapolis, Ind.....	4 00
Second premium, Mrs. Willis Fulgate, Indianapolis, Ind.....	2 00
Painting on china, Douilton, Flora V. Greenstreet, Indianapolis..	4 00
Second premium, Mrs. E. P. Thayer, Greenfield, Ind.....	2 00
Painting on china, fruit set, compote and plates, Harriet A. Van Horn, Indianapolis, Ind.....	4 00
Second premium, Daisy Altland, Indianapolis, Ind.....	2 00
Painting on china, salad set, Mrs. Maude Everett, Indianapolis...	4 00
Second premium, Harriet A. Van Horn, Indianapolis, Ind.....	2 00
Painting on china, library set, Daisy Altland, Indianapolis, Ind..	4 00
Second premium, Mrs. Maude Everett, Indianapolis, Ind.....	2 00
Painting on china, tea set, Mrs. J. J. Garver, Indianapolis, Ind....	4 00

Second premium, H. M. Allison, Indianapolis, Ind.....	2 00
Painting on china, soup set, Mrs. Geo. Coughlin, Indianapolis, Ind.....	4 00
Second premium, Mrs. E. P. Thayer, Greenfield, Ind.....	2 00
Painting on china, pudding set, Daisy Altland, Indianapolis, Ind.....	4 00
Second premium, Mrs. Willis Fulgate, Indianapolis, Ind.....	2 00
Painting on china, manicure set, Mrs. Willis Fulgate, Indianapolis.....	2 00
Second premium, Mrs. Maude Everett, Indianapolis, Ind.....	1 00
Painting on china, six plates, Mrs. J. J. Garver, Indianapolis, Ind.....	4 00
Second premium, Margaret Shover, Indianapolis, Ind.....	2 00
Ideal head, china or porcelain, Mrs. J. J. Garver, Indianapolis....	2 00
Second premium, Daisy Altland, Indianapolis, Ind.....	1 00
Painting on china, portrait, Harriet A. Van Horn, Indianapolis..	4 00
Second premium, C. E. Spahr, Indianapolis, Ind.....	2 00
Painting on china, dusted tinting, Mrs. E. H. Meyer, Indianapolis.....	4 00
Second premium, Mrs. J. J. Garver, Indianapolis, Ind.....	2 00
Best entire exhibit, Margaret Shrover, Indianapolis, Ind.....	10 00
Second premium, Mrs. J. J. Garver, Indianapolis, Ind.....	5 00

CLASS LVI—Art Work, China—Professional.

(Mrs. F. M. Williamson, Judge, Logansport, Ind.)

Painting on china, Dresden, Mrs. W. S. Day, Indianapolis, Ind....	\$4 00
Second premium, Mrs. Wm. T. Welch, Indianapolis, Ind.....	2 00
Painting on china, Persian, Mrs. W. S. Day, Indianapolis, Ind....	4 00
Second premium, Mrs. Wm. T. Welch, Indianapolis, Ind.....	2 00
Painting on china, lamp, Nellie I. Julian, Indianapolis, Ind.....	4 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00
Painting on china, three ornamental pieces. No premium awarded.	
Painting on china, relief, gold, Mrs. O. C. Wilcox, Indianapolis....	4 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00
Painting on china, Doulton, Nellie I. Julian, Indianapolis, Ind....	4 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00
Painting on china, enamel, Nellie I. Julian, Indianapolis, Ind....	4 00
Second premium, Mrs. O. C. Wilcox, Indianapolis, Ind.....	2 00
Painting on china, tankard, flowers, Mrs. W. S. Day, Indianapolis.....	4 00
Second premium, Nellie I. Julian, Indianapolis, Ind.....	2 00
Painting on china, tankard, figure, Mrs. W. S. Day, Indianapolis.....	4 00
Second premium, Mrs. Wm. Welch, Indianapolis, Ind.....	2 00
Painting on china, punch bowl, flowers, Mrs. Wm. H. Welch, Indianapolis, Ind.....	4 00
Painting on china, punch bowl, figures, Mrs. W. S. Day, Indianapolis, Ind.....	4 00
Painting on china, jardiniere, Nellie I. Julian, Indianapolis, Ind.....	4 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00

Painting on china, claret pitcher, Mrs. O. C. Wilcox, Indianapolis	4 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00
Painting on china, chocolate set, Mrs. W. S. Day, Indianapolis.	6 00
Second premium, Mrs. Wm. H. Welch, Indianapolis, Ind.....	3 00
Painting on china, tea set, Mrs. W. S. Day, Indianapolis, Ind....	4 00
Second premium, Nellie I. Julian, Indianapolis, Ind.....	2 00
Painting on china, salad set, Mrs. O. C. Wilcox, Indianapolis, Ind.	4 00
Second premium, Mrs. O. C. Wilcox, Indianapolis, Ind.....	2 00
Painting on china, fruit set. No premium awarded.	
Painting on china, pudding set, Nellie I. Julian, Indianapolis, Ind.	6 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	3 00
Painting on china, soup set, Mrs. W. S. Day, Indianapolis, Ind....	6 00
Second premium, Mrs. W. T. Welch, Indianapolis, Ind.....	3 00
Painting on china, manicure set, Mrs. W. S. Day, Indianapolis	4 00
Second premium, Nellie I. Julian, Indianapolis, Ind.....	2 00
Painting on china, six plates. Mrs. W. S. Day, Indianapolis, Ind...	6 00
Second premium, Nellie I. Julian, Indianapolis, Ind.....	3 00
China, of conventional design, Mrs. W. S. Day, Indianapolis, Ind.	4 00
Second premium, Mrs. O. C. Wilcox, Indianapolis, Ind.....	2 00
Ideal head, china or porcelain, Mrs. Wm. H. Welch, Indianapolis	4 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00
Ideal figure, china or porcelain, Mrs. W. S. Day, Indianapolis, Ind.	4 00
Second premium, Mrs. Wm. H. Welch, Indianapolis, Ind.....	2 00
Portrait, china, Mrs. W. S. Day, Indianapolis, Ind.....	4 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00
Painting on china, dusted tinting, Mrs. W. S. Day, Indianapolis..	4 00
Second premium, Nellie I. Julian, Indianapolis, Ind.....	2 00
Best entire exhibit, china painting, Mrs. O. C. Wilcox, Indianapolis	10 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	5 00

REPORT
OF THE
TWENTY-SIXTH ANNUAL MEETING
OF THE
INDIANA WOOL GROWERS'
ASSOCIATION.

HELD JANUARY 16, 1901.

EDITED BY C. S. PLUMB,
SECRETARY.

THE INDIANA WOOL GROWERS' ASSOCIATION.

CONSTITUTION AND BY-LAWS.

Was organized in Johnson County, Indiana, and was at first a county organization. The first meetings were held at Franklin, October 21 and December 5, 1876. It became a State organization, with a membership of thirteen, in 1876.

PREAMBLE.

The object of this Association shall be to encourage the interest and improvement in the breeding and management of sheep, by the dissemination of reliable and practical information on the subject. Also, by co-operating with the officers of the State Board of Agriculture in making large and attractive shows of sheep at the State Fairs.

CONSTITUTION.

ARTICLE I.

This Association shall be known as the Indiana Wool Growers' Association.

ARTICLE II.

The officers of this Association shall consist of President, Vice-President, Secretary, Treasurer, and three Directors. The Executive Committee shall consist of the President, Secretary and Directors. Three members of said committee shall constitute a quorum.

ARTICLE III.

This Association shall hold its meetings semi-annually, on Wednesday and Thursday of the same week that the Delegate State Board of Agriculture meets in January, at which time the election of officers shall take place; also the last Wednesday and Thursday in May. Special meetings may be called by the President.

ARTICLE IV.

Any person may become a member of this Association by signing the Constitution and the payment of one dollar, which shall entitle him to membership for one year (in all cases counting from January to December). Assessments of not more than one dollar on each member, in any one year, may be made by the Executive Committee, if the expenses should require the same. Each member shall be entitled to a copy of all papers or circulars issued by the Association.

ARTICLE V.

All amendments to this Constitution must be presented in writing and at a regular meeting previous to the adoption of the same, and must be supported by a majority of the members present.

BY-LAWS.

DUTIES OF OFFICERS.

PRESIDENT.

Section 1. It shall be the duty of the President to preside at all meetings of the Association, decide all questions of order, and make any suggestions that he may deem to the interest of the Association; and also to meet with the committees when required, and to fill all vacancies in the offices that may occur, and appoint all committees, unless otherwise ordered by the Association.

VICE-PRESIDENT.

Sec. 2. It shall be the duty of the Vice-President to aid and assist the President. In the absence of the President, the powers and duties of the President shall devolve on the Vice-President.

SECRETARY.

Sec. 3. It shall be the duty of the Secretary to attend the meetings of the Association; keep correct minutes of the same; conduct all of the correspondence, and receive all moneys belonging to the Association, and immediately pay them over to the Treasurer, and his books shall be open for the inspection of the Association, either through its officers or committees appointed for that purpose.

TREASURER.

Sec. 4. It shall be the duty of the Treasurer to receive all moneys belonging to the Association, giving his receipt for the same, and pay all bills and accounts that have been approved by the Association, and signed by the President and Secretary. Before entering upon the duties of his office he shall enter into a bond with security when required, which shall be approved by the Executive Committee.

DIRECTORS.

Sec. 5. The Board of Directors shall make such suggestions as they may deem necessary for the benefit of the Association, and look after the general interests of the same, and attend to such duties as the Association may require.

SPECIAL MEETINGS.

Sec. 6. Special meetings may be called by the President, and the time and place shall be published at least one month before said meetings.

DEBATE.

Sec. 7. No member shall be allowed to speak more than once on any subject, till all have had a chance to speak; and in no case shall more than ten minutes be allowed for any one speech, unless by permission of the meeting.

ADDITIONS AND AMENDMENTS.

Sec. 8. Any additions or amendments to these By-Laws must be presented in writing and at a meeting previous to the adoption of the same, and shall not be adopted unless supported by a two-thirds vote of the members present.

QUORUM.

Sec. 9. Not less than five members shall constitute a quorum to do business for the Association.

MISREPRESENTATIONS.

Sec. 10. Any member being charged with willful misrepresentation or dishonest or unfair dealing in connection with the sheep interest, shall have a fair investigation before the Executive Committee, and if said charges be sustained he shall be expelled from the Association, and it shall be the duty of any member knowing of any violation of the rules of the Association to report the same immediately to the Executive Committee.

BOARD OF AGRICULTURE.

AUDITING COMMITTEE.

Sec. 11. The President shall appoint a committee of three, whose duty shall be to audit the books and examine the accounts of the Association, and make a report when called for by the Association.

ORDER OF BUSINESS.

Sec. 12. The order of business shall be as follows:

1. Reading minutes of previous meeting.
2. Address and report of officers.
3. Report of committees.
4. Unfinished business.
5. New business.
6. Election of officers.
7. Discussions.
8. Adjournment.

OFFICERS AND MEMBERS FOR 1901.

President—Hon. J. A. Mount, Shannondale.*

Vice-President—H. H. Keim, Ladoga.

Secretary—C. S. Plumb, Lafayette.

Treasurer—C. A. Phelps, New Castle.

Directors—Chas. Roundtree, Crawfordsville; W. J. Quick, Brooklyn, and J. R. Cunningham, of Antioch.

Executive Committee—The above named Officers and Directors.

MEMBERS.

Alexander, G. W., Indianapolis; Amick, John E., Scipio.

Ball, Isaac, Pendleton; Beeler, C. C., Liberty; Binford, J. H., Greenfield; Bitting, Dr. A. W., Lafayette; Boswell, E. D., Crawfordsville; Bowles, T. E., Noblesville; Burnside, T. C., Liberty.

Carroll, Charles E., Hartford City; Chandler, T. E., Indianapolis; Collett, M. W., Metea; Conger, David, Shelbyville; Conger, Sid., Shelbyville; Cotton, I. N., Indianapolis; Coulson, J. K., New Lebanon; Cowgill, Calvin, Wabash; Cunningham, J. R., Antioch.

Darnell, C. F., Indianapolis; Dungan, S. W., Franklin.

Elder, John R., Indianapolis; Ensminger, H. N., Danville; Ewing, R. M., Lebanon.

Foster, Hiram, Deputy; French, B. F., 1704 N. Capitol Ave., Indianapolis; Furry, William, R. R. No. 4, Greenfield.

Gilliland, C. E., Gilmour, A. S., Greensburg; Guthrie, W. A., Indianapolis; Guilliams, J. A., Fincastle.

Harshbarger, J. M., Ladoga; Harvey, B. W., Bloomingdale; Hays, W. A., Worthington; Helser, Eli B., Warsaw; Higgins, John T., New Maysville; Hitchcock, D. H., Brimfield; Howard, Addison L., Lebanon; Howland, C. A., Howland.

Illyes, P. P., Noblesville.

Jackson, James, Rich Valley; Johnson, Jonathan, Carmel; Johnson, Sylvester, Irvington.

Keim, H. H., Ladoga.

LaGrange, J. W., Franklin; Leaming, Jr., Henry, Romney; Levering, Mortimer, Indianapolis; Lindley, T. J., Westfield; Littleton, L., Argos.

Magee, B. F., Montmorenci; Matthews, C., Brooklyn; Merrifield, C. E., Indianapolis; Miller, I. M., Upland; Mitchell, Robert, Princeton; Moss, W. W., Logansport; Mount, J. A., Shannondale.

*Governor Mount died most suddenly in Indianapolis at his hotel, from what was perhaps heart disease, within three hours after his election to this office.

Osborn, Cyrus, Danville.

Phelps, C. A., Newcastle; Pitcher, John M., New Palestine; Plumb, C. S., Lafayette; Privett, Uriah, Greensburg.

Quick, S. R., Brooklyn; Quick, W. J., Brooklyn.

Robe, J. W., Greencastle; Roberts, John, Indianapolis; Robison, E. A., Rock Lane; Ronk, Jesse, Ladoga; Roundtree, Charles, Crawfordsville; Rousch, S. C., Warren.

Skinner, L. B., Denver; Storms, Isaac, Middle Forks; Strange, Joshua, Arcana; Sunman, T. W. W., Spades.

Tarkington, J. C., Indianapolis; Taylor, J. W., Yountsville; Thompson, J. L., Gas City; Thornburg, W. H., Gilman; Tomlinson, Ralph, Fairland.

Vestal, Baxter, Plainfield; Vestal, F. J., R. R. No. 2, Kingman; Villiss, Louis D., Bloomfield.

Wiley, W. M., New Augusta; Williams, I. J., Yorktown; Williams, Marion, Yorktown; Wilson, Bert, Muncie; Wintrow, A. J., Flatrock.

REPORT OF THE
TWENTY-SIXTH ANNUAL MEETING
OF THE
Indiana Wool Growers' Association,
JANUARY 16, 1901.

The meeting was called to order in Room 12 of the State House by Honorable W. A. Guthrie, President, who submitted a brief address, after which the Secretary read the report of his predecessor, Mr. J. W. Robe.

President Guthrie: Gentlemen, you have heard the reading of the minutes, if there is no correction, they will stand approved as read. The next thing in order will be the Treasurer's report.

Mr. Robe: Mr. Phelps is Treasurer. I think that he has no report to make as the minutes do not show anything of the receipts or expenditures last year, and I do not know anything definite, but I think we are about three dollars and fifty cents (\$3.50) in debt. I paid all the expenses out that were necessary and there is no money to turn over to the Treasurer.

Secretary Plumb: The Treasurer told me in a conversation I had with him that he had three dollars and seventy-five cents (\$3.75) in his possession. Here is a sheet of paper which was evidently prepared at the time of last meeting.

President Guthrie: We will now take up the regular program. The first paper will be—

WHY I BREED OXFORDS.

J. R. CUNNINGHAM.

The question why I breed Oxfords, could be answered in the two words, "It pays." But perhaps this short answer would not fulfill the purpose of the originators of the program.

As the American people are constituted to-day, one of the first questions asked in regard to any vocation or business is, "Will it pay?" And as a general thing they want it to pay in dollars and cents. It pays to breed Oxfords, because they sell. They sell because there is a demand for them. There is a demand for them because of the good qualities combined in them. Hence, we claim that in the breeding of Oxfords, it pays, if done in a businesslike way, and with the same energy and push that any other successful business is carried on.

Of late we hear much of what has been accomplished during the century just closed, in the way of inventions, and improvements in general. Of a truth some of the grandest achievements in all lines have been consummated during the past century. It was during this century that one of the grandest, if not the grandest breed of sheep, was originated, improved, and perfected, so that at the present time we have in the Oxford Down breed a sheep that is surpassed by none in the show yard, on the farm, or on the block.

We learn from the history of the breed that about 1825, four or five breeders of England undertook the construction of a breed of sheep that would possess the weight of the long wools, with the quality of the Downs.

The general opinion is that the Cotswold grey faced ram, and the Hampshire Down ewe were the chief, if not the only material, which, by judicious blending and careful selection, have resulted in a class of sheep which, under suitable conditions, are probably as profitable as any that can be mentioned, both on account of size, weight of wool; readiness to fatten, hardy character and valuable meat.

It was not until 1850 that they were styled the Orford Shire Downs, the County of Oxford being their stronghold.

F. C. Goldsborough, ex-President of A. O. D. R. A., after visiting England, and making comparisons of the different breeds, says that he arrived at the conclusion that the Oxford Down was the most profitable all-purpose breed of sheep yet developed by the experience of the English breeder. This was the opinion we had of this breed of sheep when we purchased our first Oxford Downs, and why we have continued to breed them.

I would not, however, say a word of disparagement of any of the other breeds, or strive to run them down. They are all good, but what I

wish to show is the position the Oxford stands in good company. It is because of this high standing they have in select company, that we breed them. We realize that we can not build up a breed of sheep by trying to pull down another any more than can a man build up his own character by trying to run down some one else.

The merits of the Oxford Down may be as follows: They are a hardy, active, heavy fleeced, good mutton sheep. It is one of the heaviest breeds. The animals are quiet in disposition and feed quickly for the butcher. The ewes are prolific, and good mothers. They mature early, lambs often weighing 40 pounds at 30 days old, or 115 to 125 at 90 days old.

Because of their large size, heavy fleece of long close wool, and dark-like faces, they are calculated to improve all breeds by crossing, in increasing weight of wool and carcass. I have seen comparatively inferior flocks of sheep brought up to an improved condition, nearly doubling the weight of carcass and wool by the use of pure bred Oxford rams on a grade flock. It is because of this ability to improve flocks that causes the Oxford to stand where others fall.

Almost any kind of sheep will flourish when times are good, but it requires real merit to prosper when times are bad.

After the time of the recent depression in the sheep industry we noticed, in our county, that most of the flocks that remained were grade Oxfords. They were flocks that had been built up by the use of pure bred Oxford rams, and were a source of profit to their owners, even under those trying conditions.

I have noticed also that the highest priced grade flocks lately sold, have been grade Oxfords, and that Oxford grade lambs sell well in the market.

We learn from the report on "History and Present Condition of Sheep Industry in the United States," that in 1893 farmers in Ohio became convinced that wool growing could be made to pay only when combined with raising mutton. Consequently those breeds were selected which could produce a good carcass, as well as a good fleece.

As these qualities were combined in the Oxford Downs, they concluded that they were the most profitable sheep, not only for the breeder of recorded stock, but for the general farmer, in grading up his flock for wool and mutton at a profit.

This much, and more, could be said of this grand breed of sheep, as showing forth our reasons for breeding them, but time will not permit.

It will suffice to say, that this particular breed has been working up in public favor until it now stands second in numbers recorded in this country, as number recorded in record will show, and first in the showing as the honors received at the large shows in the past will prove.

At the Philadelphia Centennial, in 1876, an Oxford Freeland won the grand championship. At the Chicago World's Fair, the Oxfords brought out such exclamations as, "The best sheep on the ground," and having

in their classes yearlings weighing over three hundred pounds and mature sheep four hundred and twenty pounds.

At Omaha an Oxford again won over all, and at the great International, held last month, the Oxfords again held their own with their splendid showing in classes and their tests on the block.

President Wm. A. Guthrie: There is one thing perhaps that would not be out of order. It has always been our custom to invite the Governor to talk to the meeting, and it might be a good plan to give him notice, as Governor Mount has said that he never knew that he was expected to say anything until it was too late to make any preparation.

The motion was made to appoint a committee to wait upon the Governor and invite him to address the meeting at 2 o'clock. Motion seconded and carried.

President Guthrie: I appoint Mr. Vestal and Mr. Cunningham to wait upon Governor Durbin and see if he can give us a little talk. We will now continue the program by hearing the subject—

WHY WE BREED RAMBOUILLETS.

PROF. C. S. PLUMB.

About ten years ago we began to consider the advisability of having a type of Merinos at Purdue. We had Shropshires at that time, so that in the selection of the Merino type it was an important thing that we use great care as to what class of Merinos we should have. You know that there are some with smooth bodies and others with wrinkled bodies; also the large type and the small type. After looking into the merits of the different classes, I decided it was preferable to have the smooth-bodied Merino. This was the first thing that influenced me in the selection of the Rambouillet Merino. When it comes to shearing, the smooth bodies are not nearly so difficult to handle as the wrinkled ones. Then in comparing the breeds of Merinos I finally decided that French or Rambouillet was preferable. This type seems preferable, first, because it was smooth bodied; secondly, because it was a mutton type of Merino; and thirdly, because it had been bred very persistently for over a century, so that it was pure in its character. We bought two ewes of L. B. Townsend, who had at that time as good a flock as there was in existence in this country. These ewes Mr. Townsend selected with a great deal of care and from their mating with desirable males, we secured the flock that we have at present, of about twenty head. In our experience, we have found the Rambouillet Merinos to be very hardy, very rapid

growers and excellent mothers, producing a large amount of milk, comparatively, and as I have observed the different types of Merinos at our fairs, I have been more and more satisfied with the Rambouillet.

Now, within the past year, we have been more or less troubled with a new disease that Dr. Craig will talk to you about this afternoon, which is called "influenza," and in this our experience has been interesting. Our Shropshires have suffered most severely. We lost a considerable number of lambs and a number of ewes, and altogether it was like a blight among the Shropshires; but strange to say, not a single Merino was even affected by the disease. The contrast between the Rambouillet and mutton type was remarkable. In the ten years we have had this breed it has grown and thrived, and when I see what a boom it has had, I do not wonder that it receives the amount of attention it does, for it is certainly a very meritorious breed. I do not consider the Merino a first-class type of mutton, but I do believe that the Rambouillet offers the best type of mutton that can be found among this class of sheep. In Germany it has received more recognition for its mutton value than any other type of Merino. Its hardiness is unquestionable. I was told that in Germany this breed was in such demand by the farmers that at the ram sales it was difficult for an American, wishing to purchase, to have as good a selection as he would wish. The Germans do not wish to let the rams go away. As I crossed Germany up near the Baltic Sea, I saw herds of them, and they were about the only type I saw in all Germany.

It has been my pleasure to visit the government flock in France and also the flock of Victor Gilbert, in the same country, who is one of the best known breeders in Europe, and in these flocks I saw many fine sheep.

The Rambouillet is a breed I find at present in great demand, though it sells at a lower price than the middlewool. You know the difference between the fine wool and the middlewool fleece, the former selling for about three or four cents a pound less with us, and I presume the average yield is in the neighborhood of twelve pounds. The Rambouillets weigh in the vicinity of 150 or 160 pounds. Our sheep at Purdue are very large, and Col. Burch, of the American Sheep Breeder, spoke of their great size when visiting the University. They are exceptionally large, selected ones. When in France I purchased a yearling ram from the Government Farm, which we now have at the head of our flock at Purdue University.

This is why we breed Rambouillets at Purdue.

Mr. Robe: I do not suppose it would get us into a tangle, if I should ask how the Rambouillet compares with the other smooth bodied Delaines they have in Ohio.

Professor Plumb. The Delaine is a small type of sheep, but in my experience it very much resembles the Rambouillet, except in size, and as to the relative vigor of the two, I am not in a position to say. I do want to commend the milking qualities of the Rambouillet. They have large ud-

ders and the teats on them may be two inches long or longer. They are very good milkers and there is no difficulty as to the lambs getting plenty of nourishment.

Mr. Dungan: It would seem to me that the great size and length of the teats would be a very serious objection, for they may have trouble getting the teat into the lamb's mouth, and while I am favorably impressed with the Rambouillet, and have thought for a number of years that I might perhaps invest, yet it does seem to me that the size of the teats would be an objection to them.

Professor Plumb: I think that the best reply I can give you touching that objection, is the large percentage of lambs that the ewes raise. I have not any report to make of the raising of the lambs, although we keep a very careful record of the number of lambs dropped and all that, and I am not prepared to say how many ewes drop twins, but I do not hesitate to say that more than half of them have twins, and it is seldom that we lose Rambouillet lambs. I do not mean to reflect on other breeds, but this is simply brought up as showing results of our selection of a type of fine wool. There is no doubt of its hardiness and resistance in comparison with the middle wools. It is generally admitted that the fine wool sheep are more hardy than the average long or middle wools.

A Member: When the Professor spoke of this class suffering less with disease, I quite agreed with him. We usually breed from 150 to 200 sheep, including Shropshires, Southdowns, Oxfords, and others, and I noticed this year how most of them suffered with disease, and I noticed that our black-faced sheep seem to suffer more than others, and while I know nothing about these sheep that the Professor talks about, there is no doubt, gentlemen, but that the fine wool sheep are the hardiest, and are also the best milkers, and perhaps the best mothers, and I have always preferred them as a foundation herd.

Mr. Robe: I should like to know what per cent. of lambs are twins.

Secretary Plumb: I have not the figures here with me, but I am sure that over fifty per cent. of them are twins, and I suppose that we raise most of these.

Mr. Ensminger: In crossing, as in raising farm sheep, you do not expect to keep them a pure breed. What would be the better class of sheep to cross on these Rambouillet sheep? Will your Rambouillet sheep make a half and half cross? We do not all have barns and conveniences for keeping pure breeds. I don't suppose any man has a pure bred sheep on his place, unless he has a barn. I bring this out so that we may get all the practical points. Governor Mount has come as near being a practical shepherd as any one I know, and we should like to hear from him.

Mr. Cogwill: In reply to Mr. Ensminger, I do not think the Merino rams of this class have been used very much on middlewool ewes, and especially, not in this country here, and I should not recommend the use of a Rambouillet ram on a middlewool flock. In my opinion, the great demand in the United States is going to be for a combined mutton and wool sheep. So I should prefer to use the males of the mutton type on grade Merino ewes. I should prefer to use the type of male that could be mated with the lower grade Merino ewe, and so give you a better selling lamb in the market or even better selling ewe. The great place for Rambouillet rams has been very largely on the western ranches, where they have been used to improve the sheep where they are inferior in size and quality. Take a thousand of these common ewes and cross them with a good type of ram, and you will get something that will bring a good price in the Chicago market.

Mr. Dungan: Did I understand you to say that they would average twelve pounds of wool?

Professor Plumb: Yes, sir.

A member: How does it compare with others in texture?

Professor Plumb: Here is a point I want to bring up. In 1893 I had a talk with E. D. King, who was showing some very superior Spanish Merinos at our State Fair. He was from Kansas, and was one of the largest breeders of that type in the whole west. He drew on Vermont for his breeding stock, and at that time had a very fine exhibit, which he was taking to the World's Columbian Exposition. We had a discussion on the quality of fleece, and while he preferred a smooth body for some reasons, he said that the smoother the body of the sheep, the coarser the staple became, and that he got the finest quality of fleece from the wrinkled bodied ones. He said that in taking the sheep to Kansas there was a gradual deterioration of the quality and he had to turn back to New England for his improvement in stock. That is in line with the opinion of other breeders, and it is given to show that a wrinkled body produces a finer staple than a perfectly smooth body. It is interesting to me that within the last twelve months Mr. King has taken up the breeding of the Rambouillet sheep. He has been in Ohio and has purchased largely from some of the most prominent flocks in Ohio.

A Member: Is the wool longer?

Professor Plumb: I will say in a word that it is no longer. It is finer than the average Merino, but not as fine as the best Spanish or American Merino.

Judge Cowgill: I have been experimenting with the Rambouillet sheep for four years. I think they are equally as good mothers as the

Spanish Merinos. They will not give a heavy fleece. This is my experience. They won't yield as heavy a fleece if you weigh it when first taken from the sheep's back, as will the Spanish Merino, but when the impurities are taken out, when it is scoured, and thoroughly cleansed, it will. I have not tested it, but I believe that the yield, scoured, will be as much or more than the other Merino types. They have proved themselves, with me, equally hardy as any sheep that I have been breeding for many years. I have tried all the sheep we have in this country, and I say to you now that in my judgment the Rambouillet crossed with a high grade, smooth bodied Merino, is going to finally be the sheep of this country. It will take a good while to convince the people that this is true, but I think they will come to it after a while, and one of the principal reasons why it is so, is because they are much hardier than any other kind of sheep. I had 170 odd lambs this summer, I think 178, perhaps, and I didn't lose a single lamb through the entire season. My son has a farm near where I raise my sheep, and he had 140 or 150 Shropshire sheep. He lost between 30 and 40. My neighbors' sheep all around were dying and not a single one of mine died. I sold 100 of them when they were a little over seven months old, and their average weight was 85½ pounds, a pretty good weight for a Merino lamb. I never have them come until April. I have a ram now that will weigh 250 pounds, and some with as high as 23½ pounds of wool. He is a registered ram. I am very much pleased with the breed. I don't think that with mine that I have that the fiber is quite as fine as the Spanish Merino, but it is longer.

Mr. Dungan: Mr. Chairman, we want to get the expression of more of our wool growers, and my friend here to my left says that he has no such luck with the Rambouillet.

Mr. Matthews: Well, gentlemen. I never owned a Rambouillet sheep, and I don't think I ever will if I keep my senses. A neighbor of mine bought a great many Rambouillet sheep, and I am free to say that when they first came into the neighborhood I liked the looks of them, and they were bred to first-class Shropshires. Well, they were so ornery that the ticks would not get on them. They like to have not got their sheep sheared at all, and finally had to call in more help and the men charged by the day—they wouldn't shear them by the head at all. That was Rambouillet enough for me.

Mr. Roundtree: Gentlemen, I got in late, and my father used to say that small people were to be seen and not heard. I have been listening to the trend of this discussion, and I think there are some points that we could be enlightened on, and I have always said that one fact proven is worth a ton of argument. You have talked of the Rambouillet as a cross-breeder on different breeds of sheep, and to obtain the best wool and mutton what is the most advisable thing to do, and if I can prove to you

the betterment of one wool over another, I think I am not imposing on this convention. [Mr. Roundtree then showed some samples of wool from pure Tunis sheep, and wool the result of crossing Tunis rams on other sheep.]

President Guthrie: We will now continue the regular program, and continue the breed subject, with the topic,

WHY I BREED TUNIS SHEEP.

CHARLES ROUNDTREE.

Mr. President, and Gentlemen of the Wool Growers' Association: You have asked my reasons for breeding Tunis sheep.

First. They have more constitution and stamina than any other breed, being of strong mountain blood, belonging to the Asiatic race. They are adapted to all climates and surroundings, standing either heat or cold equally well. This fact has been proven in the North as well as in the South. I have placed them in twenty-two different States and Territories, and New Zealand, in the last five years, and from Maine to Washington, and from Massachusetts to Florida, and we find them doing well and succeeding at every place under ordinary treatment.

Second. I breed them because I find in them the strong points that other breeds lack. Potency, early maturity, and great dairy qualities in the ewes, which is the life of the early market lambs, and the late ones, too.

Third. I breed them for the sole purpose of both wool and mutton. Tunis wool is superior in staple to any of the English breeds. As cross-breeders we improve the wool on all breeds of sheep, as my samples of wool will show. Tunis wool has commanded a premium over other wools for the last four years. As for the mutton qualities of our breed, no other breed ever approaches them for quality of flesh, not all fat and blubber, but real mutton, equaled only by the small mountain sheep of Wales, and the Black Faced Highland sheep of Scotland. They are just what the present markets are demanding, medium size, light in bone, early maturing, fattening easily at a very early age. This is why the butcher is willing to pay an extra price for our lambs.

Our people in America are only beginning to use mutton instead of pork. With less than 40,000,000 sheep and 75,000,000 people, the outlook for mutton was never more encouraging to the sheep breeders. The question comes to us, "What kind of sheep shall we breed?" There can only be

one answer, the breed that will produce the grade of mutton and quality that our home markets demand. for our people will have the best, and are willing to pay for it.

The day for the heavy breeds of sheep is past. Seventy-five per cent. of all the sheep sent to market are lambs. More than 14,000,000 head of sheep are consumed annually in our American markets, hence we must meet this demand with the right kind of lambs.

Some breeders may say, "You will ruin the Shropshires, Oxfords, Southdowns and Merinos, if you introduce Tunis blood in your flocks."

Some thirty years ago, when the Aberdeen-Angus cattle came from Scotland, the cry went up from the breeders of Shorthorn cattle, you will ruin the beef cattle of America. They were badly scared, but not hurt. What has been the result? The Shorthorn of that period is not the Shorthorn of to-day. Wherever Angus blood has been introduced, it has improved our cattle. The same thing is coming with the Tunis sheep. Five years ago when our breed was being reintroduced in this country, the cry went up from the old time breeders, "You will ruin our sheep." What has been the result so far? They have proven themselves worthy of the highest rank of all the breeds.

The Tunis sheep, like the Angus cattle, are coming to help you and not to ruin your sheep. These are my reasons for breeding Tunis sheep.

President Guthrie: We will now pass on to the next topic,

WHY I BREED CHEVIOTS.

H. H. KEIM.

I breed Cheviots for my health. It is pretty good, too. I breed Cheviots for a number of reasons. Seriously, it was by an accident that I became acquainted with the Cheviot sheep. I was buying sheep and lambs for the Philadelphia market from 1885 forward, and about 1888 I found a bunch of grade Cheviots in the mountains of Pennsylvania, where I lived, and bought them, including some weathers and a few yearling ewes. They looked pretty to me, and when I weighed them they weighed well, and when I sold them they brought me money, and the old Quaker who bought them said to send him a carload of them, and, so it was in that way I became interested. There was a fellow who had a pair or trio that he had brought from New York, and I took a great fancy to the sheep, and to this day I have never seen a better foundation sheep. I have learned to love them more and more and have continued to breed them for eleven years, because they have been profitable, and handling them has

been a pleasure to me and there is a growing demand for them, and they are hardier than any other sheep. These are a few of the practical reasons. I have not the audacity to say they are the best on earth. I would not say that they would grow and thrive with nothing to eat, but where a man has good sheep sense, where he looks after them and deals kindly with them, they will please, and prove profitable as well. I believe that there is room on this sphere for all of us, and I believe the Cheviot sheep has a place. He has made a place for himself, and he has proved himself worthy of his place, and he has held it for over a century. They have not been in the hands of people who boom them, but they have a friend or two, and I am one of them. At Chicago, at the late exposition, three Cheviots sold for \$300, the highest price paid for any sheep sold at the show. I have placed them in the hands of a great many wealthy people, including Senator Elkins, of West Virginia, and other prominent people, who are using them for the beauty and adornment of their grounds, and because they furnish an excellent quality of mutton."

A Member: Give us a few of the principal characteristics.

Mr. Kelm: One of the principal characteristics is that they are a white faced sheep. They are covered with a fine, white fleece. They are peculiar looking, having no wool in the face, but having a decided ruffle around their heads. They carry their heads very high up. They look wild, but they are just as docile as any sheep I ever handled. Their bodies are very compact and on short legs. The wool is white, and it scours very white.

Professor Plumb: I would like to speak just a few words in addition to what Mr. Kelm has said on the Cheviot, that may not be known to a large number of sheep breeders in the room, but Indiana is becoming a very prominent Cheviot center. In Putnam, Parke and Montgomery counties there are getting to be a great many. Mr. Kelm has one of the largest, if not the largest, collections in the United States, and there are many other good ones, particularly in Putnam County; and from what I learn in talking to people in that vicinity, it is constantly growing in popularity so that the breed is not a stranger in our own State. For at least ten years, and perhaps for a longer time, it has been bred in Indiana. I suppose if you would take the grades and pure bred ones, there must be somewhere in the neighborhood of one thousand in this State scattered about, or perhaps over a thousand. The breed is a candidate for recognition in the United States on the basis of being a middle wool, and of very superior hardiness and producing a flesh that ranks among the very best for table use, and having a staple that will shear well and bring top prices in the market. It is a breed that so far as I can see will be heard a great deal more of in the future than in the past. It is being recognized in the different fair associations, most of the State fairs having special classes for Cheviots, and some of the county fairs are providing special classes

also. New York State and Indiana are the two principal States breeding Cheviots, but they are bred in from twelve to twenty States, and I am told that there is a flock of ten thousand pure bred Cheviots in the Canadian Northwest.

Dr. Quick: Mr. Chairman, I have been observing the Cheviots recently, and I do not believe I know of another breed of sheep as uniform as the Cheviot. You may divide the sheep up, look them over, and I believe they are the evenest lot of sheep that I have ever looked at. I saw Mr. George McCasline's, and they are very fine.

About the Tunis sheep, there was a large number of them at the South Carolina Agricultural Station when I was connected with it. I will say that tails of the sheep are big and flat and that they seem to develop more than we should want them to in the United States, but I want to impress this one point that was voiced by Brother Keim, and that is that there is room for all these good classes of sheep in America. I believe there are special places where one breed would do better than another, and these things are important to the man adopting a new breed, and he should give it very careful consideration from the standpoint of his environment.

Mr. Roundtree: Dr. Quick speaks of our breed of sheep having a large flat tail; that is a fact. They do, and when they were first adopted there was great objection to the broad flat tail. Now we cut that tail off and you have no more broad tail on the Indiana Tunis than you have on the Shropshire or Merino. When the tail is cut off, all the strength or flesh that would go into that tail goes into the back and it puts one of the finest backs that you ever saw on a sheep.

Mr. Dungan: I want to say that I am very much gratified at hearing this, for this is one point of objection I always had to the Tunis, this tail. It was entirely too heavy behind.

President Guthrie: We have several others on our program, who were to discuss different breeds, but as they are absent we will pass on to the next subject, which is

RAISING HOT HOUSE LAMBS.

F. J. VESTAL.

This is a subject seldom written upon by Western writers, and any person entering in the sheep business should select the breed of sheep he fancies, providing they are adopted to the locality in which he or she may

live. Having a fancy for a certain breed, one will take pride in them, give more care and closer attention, which goes to make success.

Raising hot house lambs is a specialty, and to gain success you may not have the above liberty, but will have to part with these fancies and seek to produce what the consumers want. What the consumers want is the most irksome task to accomplish. Their preference is for a lamb that dresses 20 to 25 pounds. The loin must be broad and thick, and hind quarters heavy; the general shape of the sheep to be blocky. The fat does not want to bunch, but to be distributed. The caul should be spread over the carcass, after the back sets are in, and it must be solid fat and not a thin, transparent membrane.

I have found it more profitable to give customers a little heavier lamb than the above. At the age of 60 days our lambs decrease from 48 to 50 per cent. in dressing. This leaves about 30 pounds of mutton, at 25 cents to 28 cents per pound from Christmas to Easter.

The pelts properly handled will usually bring \$1. Alum and saltpeter will preserve the skin.

The sheep barn should be made comfortable, and all cracks stopped. Don't let the wind and snow blow under the weather boarding, but give ample ventilation and get all the bright sunlight possible. Many know the old adage, "There is no rest for the wicked," neither is there any for the man in charge from the time the first little fellow is due until the last is shipped; it is a continuous care. If the night is cold do not neglect to go to the barn before retiring. Have the alarm call you at 12. Get up and immediately attend to any new births. If the lamb is chilled or not well cleaned, a bath in a bucket of warm water will revive him, and a bottle of warm milk will put him in a condition to start. Place the mother with lamb in a box stall and allow them to remain until the lamb is three or four days old. Our next duty is to mark the ewe's ear tab number on the lamb. Then it may be transferred to a more ample apartment. At the age of 8 days remove lambs to a division of the barn. In this section have the lamb creeps erected. From this age on the lamb will eat. Do not feed corn and cob ground together, for this will prove fatal. They not only prefer coarse ground corn meal, but it is nutritious. Taking 100 pounds of this meal and 40 pounds of bran, makes a satisfactory feed. Keep a sufficient supply of feed in the troughs so the lambs can have it at all times. On marketing or shipping day, select and kill the best qualified for the purpose, but not necessarily the oldest. Take the number of the lamb, and find the mother and put her in an apartment where proper care may be exercised to prevent milk fever.

As to dressing the young lambs, I will not go into detail. Any one wishing to prepare them without a wool stain or finger mark, inflating with air and placing back sets, had better go to a professional butcher and take instructions in the art of dressing lambs, but if you have no desire to take lessons, then mutilate a few bodies of your own flock, when the trials and troubles of the hot house lamb business will dawn upon you.

Mr. Ensminger: I would like to ask what is the most preferable time to have hot house lambs dropped, and how early you can raise them?

Mr. Vestal: If you want the best prices, about Christmas is the best time, for soon after Easter they begin to bring them in from the farms.

Mr. Ensminger: Can you have the lambs dropped at any time you want them?

Mr. Vestal: I think I can manage the Rambouillet.

Mr. Roundtree: Mr. Chairman, I am proud to say that our Tunis ewes will drop lambs any month in the year. Our Tunis will drop their lambs in August, in September and in June.

Mr. Matthews: Then you have got the breed of sheep I want, one that I can make sure to get a lamb from any time in the year. It's what I've been after for years.

Mr. Roundtree: You have not had the blood to do it with.

Mr. Baxter Vestal: I have had no trouble in Dorsets getting lambs any month in the year, but I have not been able to do it with any other breed but the Dorset.

Dr. Quick: Mr. Vestal's experience has been about the same as ours. We have had a few that bred twice a year, but we have not attempted it to any extent, for we think that it is as a lady said here, that if we raise a pair of lambs a year we would be doing pretty well.

Mr. Vestal: I do not think it practical. It was merely an experiment with me.

Mr. Dungan: If a man wants to raise two or three litters a year, he ought to go into the goat business.

Mr. Ensminger: I had a neighbor whose lambs came along in December about Christmas. He said he put his buck with the ewes only once a year. He was very successful in sheep raising.

Mr. Matthews: I want to say a word about taking care of young lambs in cold weather. If our lambs are dropped in February, and it comes a very cold night, we go out to the barn once or twice. We crowd them into the barn thick when the thermometer is below zero, and the thicker they are crowded together the warmer they will keep. If they were scattered out the lambs would be liable to freeze. Then once or twice in the night we put the lambs in a bucket of warm water.

Secretary Plumb: Before adjournment I wish to say a word about the matter of membership dues. The Association has to be supported by an

income of some sort. The regular dues are one dollar for new members and twenty-five cents a year for maintaining membership, and I would like to notify every person here to come forward after adjournment and pay twenty-five cents apiece. In connection with this subject I wish to state that this Association was organized on the 21st of October, 1876, in Johnson County, and was a local affair. Later it was made a State association. Of late conditions have changed, and it would be a good thing to appoint a committee to revise the constitution and by-laws, to report at the next meeting of the Association.

The motion to appoint a committee was made, seconded and carried.

Secretary Plumb: I would like to have that committee have President Guthrie as a member of it.

President Guthrie: I appoint as that committee Professor Plumb, Dr. Quick and Mr. Keim.

The meeting then adjourned until 2 p. m.

AFTERNOON SESSION.

The meeting was called to order by the President at 2 p. m., and the first thing on the program was a paper on

WOOL AND ITS VALUE.

GEORGE MERRITT.

This is a somewhat prosaic and matter-of-fact subject, a subject in which some of the facts are constantly changing. But there is one fact relating to wool that is true to-day, and has been true through all ages. Wool and the sheep on which it grows have always been and are to-day wealth producers.

We may not believe that the ram that bore Phryxus through the air to Colchis had a fleece of gold, still the story, mythical as it is, is interesting as showing that before history began to be written, wool was the emblem of wealth, and from that time down to the first mention of the wool sack, the seat of the Lord Chancellor of England in the House of Lords, wool has been the synonym for wealth and honor. At the present time the saying "All wool and a yard wide" is perhaps the latest expression associating wool with honor and wealth.

We no longer, Jason like, undertake Argonautic expeditions in quest of the mythological golden fleece, but every year witness numerous expeditions to England, Germany, France and Spain in search of the ram whose fleece will bring its owner the largest portion in gold; and having found him his merits as a wealth producer are heralded from one end of the land to the other.

But I presume when you asked me to talk to you to-day of "Wool and Its Value," you expected me to tell you what each kind of wool is worth to-day, and still more important what it will be worth next June and next year, but I am no prophet, and I can hardly tell what it is worth to-day.

One year ago I believe unwashed medium wool was worth 25 cents per pound, and paid that price, but the numerous wars of the last twelve months has so disturbed the consuming capacity of the world, and the demand for wools, and woolens has so fallen off that to-day when I pay 21 cents for the same kind of wool I am no more confident of being able to put it into goods at a profit than I was when I paid 25 cents. Wool is worth all you can get for it; and 25 cents seems to me the ideal price, but idealism is not profitable in the wool trade, and 21 cents beats the 11 and 13 cents of a few years ago several points.

Manufacturers base all their calculations on the scoured pound, and through numerous careful tests they become very expert in estimating the shrinkage. "Medium scoured wool," such as we get from Southdowns, Shropshires and all the Downs, Cheviots and some of the crossbreds, is worth to-day 40 cents per pound. Full blood Merino wool is worth to-day, scoured clean, 50 cents per pound.

The average shrinkage of Merino wool this year is 66 per cent., and medium wool 47 per cent. If we pay 17 cents per pound for a fleece of unwashed Merino wool, and it shrinks 66 per cent., we have a cost per scoured pound of 50 cents. But in each fleece of fine wool there are several sorts of different values. It will be approximately correct to say that—

One-third is worth 47 cents;
One-third is worth 50 cents;
And one-third worth 53 cents;
Average value, 50 cents.

The same is true of medium wool:
Approximately one-fifth is worth 35 cents;
Approximately three-fifths is worth 40 cents;
Approximately one-fifth is worth 45 cents;
Average value, 40 cents.

But often the manufacturer meets another problem. A clip of wool is brought to him taken from sheep that have not been properly fed and cared for, that have had poor pastures in the summer, and insufficient food in winter. The wool is harsh and brittle, and is only worth 25 cents

per pound scoured. The fleece doesn't weigh so much by about two pounds, but we pay 21 cents for it, and it shrinks in scouring only 40 per cent., and we get scoured wool costing 35 cents. Another farmer comes along with wool from stabled sheep fattening for the market, his fleeces weighing two to three pounds more than the normal, the wool worth 40 cents scoured, but shrinks 55 per cent. For this clip we pay 18 cents, and it costs, scoured, 40 cents. This man usually kicks, but he has been treated fairly. His fleeces have averaged 10 pounds, at 18 cents—equal to \$1.80, while his neighbor, whose sheep have had ordinary care, has fleeces averaging 8 pounds at 21 cents—receives \$1.68.

But the farmer that seems to have the best right to complain and who always has my sympathy, is the good farmer who takes proper care of his sheep, neither over-feeding nor starving them, but sometimes between the first of November and the first of March he is away from home for a week, leaving the sheep in the care of the hired man, who thinks more of his own comfort than of the sheep, feeding them irregularly or insufficiently. When the farmer comes home his sheep are very glad to see him, and he is pleased with the ardor they show in meeting him, but when he takes his wool to market the manufacturer finds that the wool that grew in the week that the hired man cared for them is brittle, and will break easily. At that point the wool is worth only 35 cents scoured or 19 cents unwashed. With 8 pounds to the fleece this gives him \$1.52, a loss of 16 cents per fleece chargeable to the hired man.

But there are many other causes that will make the wool weak and less valuable. Over-feeding for one day may produce a feverish condition that spoils the wool at that point. Too many ticks will damage all the inner end of the wool. Any disease, although temporary, will have a similar effect on the wool, and a good judge of wool who has given a thought to these things, can, on a careful examination of the wool after shearing, very nearly tell what has happened to the sheep in each month of the year.

As a rule, the best wool is grown on sheep that are never stabled. Give them clean pastures in summer, and clean feeding yards in winter, and sheds under which they can find shelter when they want it, uniform feeding, avoiding extremes as to quality or quantity, these are the conditions that give good, sound wool, wool that will scour up lofty and the cloth made from it will have a lofty, elastic feel. It will take colors evenly, and the colors will be bright and permanent.

As it has been more than sixty years since I fed my father's sheep in that northland when the snow often came in November and continued to hide the grass until April, I must recognize the fact that you who are feeders of the flocks of to-day have learned much in that long period, and it would be presumptuous in me to undertake to advise you as to the details of your work, or as to the value of different foods as wool producers. But I am happy to know that in our Purdue University, a State institution we

are all proud of, experiments are being constantly carried on by intelligent, trained experts in every branch of husbandry, and the results are freely given to all who ask for them.

There is one line of experiments that I think might be taken up by them, that to my knowledge has never been pursued by any agricultural college, and that is testing the shrinkage of wool in cleansing, taking the wool as it comes from the sheep, and finding the exact weight of clean scoured wool in the fleece. If the owner of a stud flock could produce the certificate of Purdue University that a certain registered ram produced a fleece of wool of twelve months' growth that when scoured clean weighed seven or ten pounds, he would have a basis for a good price, and the buyer would know what he was buying.

A Member: Why does a man who fattens his sheep get a less price?

Mr. Merritt: Because he produces more grease in the fleece. Normal medium wool shrinks 40 per cent., while if sheep have been fattened it would be 55 per cent.

Mr. Collins: There would be more oil and more filth of all kinds.

Mr. Merritt: There is quite a difference in stable sheep in its value per pound than that which has had ordinary care in running.

Mr. Collins: You think it is not advisable to stable sheep?

Mr. Merritt: I think not. I heard some gentlemen speak of crowding sheep into the stable thick enough to help them keep warm. I think that will produce feverish conditions that will make the fleece brittle and break. If you have plenty of room for them under shelter, they will go there when they want to—they know when they want to go in.

Mr. Collins: What criticism would you make of Indiana wools?

Mr. Merritt: I think that the wools of Indiana, as a class, come to market in as good condition as any in the country. I claim that the Indiana wools, and especially of central Indiana, are ahead in character and quality of any other State in the Union, not excepting Kentucky, in the blue grass region. Sometimes you hear it "Indiana and Kentucky wools," sometimes "Kentucky and Indiana wools." "Kentucky wools," in the markets, means the blue grass region.

A Member: In what way would you suggest to improve our wool in appearance and stability?

Mr. Merritt: Taking careful, persistent and uniform care of sheep, not over-feeding, not letting them go hungry, will keep the wool in its best condition. Among a class of careless farmers the most harm is done to the wool in letting them run everywhere, into straw stacks, etc., when they get

chaff in the wool of the neck and back. It is worse than burrs. They should have proper feeding troughs to feed hay, so that none of the hay may be over them. They should first be able to get their noses to the hay and not get the seed in the wool.

Mr. Howland: What do you recommend for tying wool?

Mr. Merritt: A smooth hemp twine. That which is known as common wool twine is very unsuitable, the fibres of which go through the yarn and streak. The hemp twine being a different material from the wool won't take the color.

Mr. Vestal: The name of the twine is broom twine.

President Guthrie: We have ex-Governor Mount with us, and he has consented to address us. Governor Durbin will be unable to meet us on account of a previous engagement. We will take pleasure, however, in now hearing Governor Mount, who has long been identified with this Association.

ADDRESS BY EX-GOVERNOR J. A. MOUNT.

[The last address delivered by Governor Mount, who died very suddenly about three hours after its delivery.]

I have no particular theme to discuss this afternoon, and I hardly know what will be interesting for me to say to you, but just now I am greatly pleased with the thought of laying aside public duties and responsibilities and going back to look after the flocks and herds once more. I have not, during my brief stay away from the old farm, forgotten my love for farming. On the contrary, I go back to that vocation with increased interest and with the expectation of devoting the rest of my days to that noble business, and I shall endeavor, as far as possible, always to help along all lines that will in any way benefit agriculture. I am satisfied, gentlemen, that no vocation in this country is so poorly managed and given so little interest, even by those who spend their entire lives on their farms.

There is no vocation of which I know upon which so little time, attention and earnest thought are given as to that of agriculture. Upon its prosperity depends the prosperity of the entire country. As I go over my own State—and it has been my good fortune to visit every county in the State—I see the slovenly methods, the weed-grown meadows and fields. But the time has come when a radical change is demanded. The farm lands of Indiana are rich and fertile, and we can not now, as was once done, wear out a farm and move onto another one. There has been so much extravagance and waste in this respect. So much of the future

prosperity of the country depends upon the intellectual management of the farms that more thought must be given to this vocation by men engaged in it.

Some people think that this is a narrow vocation, but it is the most difficult problem now confronting the people of this country. What we want is a scientific study of it. It takes greater ability because of the many sides of the question, and the time has now come when brains and means must be appropriated, as there are now more questions to be mastered than ever before. We have not enough ambition and perseverance. I would have our farmers to-day more interested in their work.

To-day, as I lay aside the duties and responsibilities of the office of chief executive and go back to my farm, I realize the happiest moment of my life. There are as great possibilities on the farm as anywhere else. This is the Wool Growers' Association, and in the State of Indiana we ought to have two or three millions of sheep instead of less than one million and a half. In my judgment as a farmer, one who has devoted the energy of his entire life to it, with a brief intermission, there is enough wasted in the State to keep a million and a half sheep; and yet farmers talk about economy and saving.

You go over the State and see the great waste, see the weeds covering the pastures and fields. This white-top that is taking the country—it is a disgrace to the farmers of Indiana that these things are true. My sheep take care of my meadows and fields and prevent all this unsightly appearance. There is so much that is unsightly that might be avoided. Don't understand me to say that I keep sheep as scavengers, but they certainly add greatly to the beauty of a place. Is it not strange that with two farmers living side by side, everything about one will look prosperous and comfortable, and he will accumulate wealth; about the other everything will look slovenly and unsightly. It depends altogether upon the intelligence displayed, and, to my mind, there is no greater assistance to a farmer than that given by the keeping of sheep.

Now, I know that some farmers get big profits and others never seem to make a success of it, but when a man fails, it is because he has not intelligently attended to the business. I have found this out in the last two years. By way of showing whether there is any profit in farming or not, I have been four years away and during my absence my son-in-law has occupied my farm and looked after the interests, and he has just sent me the results. The total sales amount to over \$18,000, the net profits, above all taxes and expenses, over \$7,000, besides a great number of improvements.

I might call this a telephone farm, for I have a telephone there and keep in daily communication with what is going on. I should always advise investments in flocks and herds rather than any other investment to be found. What we want is a little more enthusiasm in this noble vocation in which we are engaged. We must believe more in it, we must talk

more of it, we must give each other the benefits of our experience, and we then shall have better results.

There is nothing more ludicrous or foolish in my eye than the way in which farmers delight in moving to the small cities, leaving their farm homes and going to the neighboring city, where they buy themselves homes and make other improvements. Why do they not put those improvements on their lands? These are only some of the discouraging features along the line, which we meet face to face every day. The farmers now have rural delivery of the mail, the daily papers brought to the door, electric lines running all over the country, and there will be still more added in the near future. These are helping to eliminate the disadvantages of a farm. And I say to you wool growers—and I am glad to know that when I talk to wool growers I am talking to farmers—I received last year 24 cents straight for my product. I do not know whether you received better prices or not. I was offered 25½, but the prices declined.

In the matter of sheep husbandry, I keep two purposes in view, mutton and wool, and I have had very gratifying success. No part of my farm has been more profitable than the part devoted to wool growing, though I have had very gratifying success with all kinds of live stock. There is profit in cattle, there is profit in hogs, there is profit in all branches of farming, if you put intelligence in them. In going over the State I see a great many cases where there seems to be very little profit, but it must be on account of bad management; so that I say to you, the wool growers of Indiana have an important work to accomplish. We must get to a higher standard, we must have better flocks on our farms—it costs no more to keep good ones than it does to keep inferior ones.

I must not occupy your time, but let me urge on you the necessity of earnest work, and let us endeavor to do something whereby we may prevent contagious disease among the sheep. I urged on the Legislature at its last term the necessity of this measure, and here in Indiana we are greatly in need of such a law to stamp out disease. I secured last term on the last day a bill to be read in the Senate relating to this matter, but the members of the State Senate said, it is no use to try in Indiana to get any law for the protection of the live-stock interests. I did everything I could to get the bill through the State Senate, but up to this time there is nothing for the prevention against the spread of infectious disease. The laws that we have do not meet the requirements of to-day.

I have made a careful investigation of this matter. If I should be asked what precautions should be taken in buying a flock of sheep I should say that you could not be too cautious. At one time I sent to Chicago and purchased a lot of sheep, and the lesson which I learned at that time was that too much care can not be taken. I should say above all things, know that your sheep are absolutely free from scab. I never bring them about my buildings or put them with other sheep until I have had them for two or three months. for, after having those sheep which had been

bought at Chicago for more than two months, the disease developed and caused me a great deal of expense and inconvenience, and finally resulted in my sending them back to Chicago. This was experience enough for me, and I shall always be very careful hereafter in bringing sheep upon my farm.

In my message to the Legislature I spoke at length of these matters. I hope, gentlemen, that you will speak out and let your members know that the sheep interest is no mean interest, and that the Wool Growers' Association means finally to carry this law into effect. This interest ought to be growing in our State. It is too important to be overlooked. No one interest ought to be guarded more particularly than this. I have 250 sheep on my farm, and I expect to keep that number, or more, all of the time. They keep my farm in the best possible condition, as far as cleanliness is concerned, besides the fertilization which they afford. As the old quotation goes, "Where the golden sheep tread the land becomes rich." The fertility of the land increases. We are rapidly wearing out the land, and we ought to have the intelligence and goodness to do the best we can toward economy in this direction instead of adopting methods which are simply destructive.

I am taking too much of your time, but I should like to say that I expect to be with you as a wool grower, directly identified with you as a farmer, and with you always to use my very best endeavors to bring about whatever is best for the agricultural interest. When I tell people that I am a farmer I do not apologize. I am proud to be one of you and to say that I am a farmer. I want to see more of that spirit, and with it will come greater possibilities on the farm than ever before. The possibilities on the farm are greater than in politics. It is no mean occupation, but if we expect to do anything to further our interests, every man must speak up, must speak for himself and act for himself and make the best of his environment. Let us magnify our vocation; let us beautify the country and our rural homes. This is the grandest and best of all vocations. I thank you for your patience; I have occupied too much of your time.

Secretary Plumb: It would be well to make a motion to appoint a committee on nominations before this session adjourns, so that they may get together and discuss the matter and report later in the meeting.

President Guthrie: Gentlemen, what is your pleasure?

Mr. Robe: I make a motion that a committee be appointed to nominate officers for the next year. Motion was seconded and carried.

President Guthrie: I appoint Mr. Robe, Senator Lindley and Mr. Collins.

Mr. Lindley: You will have to excuse me. I am liable to be called away any moment.

President Guthrie: I appoint Mr. Dungan in place of Senator Lindley. We will now proceed with the program, and listen to an address on

INFLUENZA IN SHEEP.

R. A. CRAIG, D. V. M.

In veterinary medicine the term influenza has long served as a collective name for a variety of epizootic diseases of the horse, the nature of which could not be proved in a satisfactory manner. When a number of animals in the same stable became affected by a feverish, inflammatory malady, people called the disease "influenza." In these epizootics different organs of the body were affected and various symptoms were shown by the different individuals.

During the past year considerable losses have occurred among the sheep in this State from a disease that resembles influenza of the horse, and is termed influenza, enzootic typhoid catarrh and malignant catarrhal fever by the different writers on diseases of sheep. This is not a new disease. During the first half of the last century American writers spoke of and described it and Randall, in his work entitled the "Practical Shepherd," speaks of it as an enzootic disease among the sheep in the State of New York, causing in large flocks quite serious losses.

Influenza in sheep is considered by some an infectious disease, and from its extreme prevalence in certain years we are no doubt right in considering it as such. It prevails principally when the variations in temperature are great; during the winter and spring. The disease may, however, exist during the summer if conditions are favorable. As in other diseases, age, breed, care, hygienic conditions, etc., will influence the number of animals affected in a flock. Exposure, draughts, confining the flock in too close quarters and poor ventilation are the most common predisposing causes.

The catarrhal form is the one most common among sheep. The general condition is greatly disturbed; the animal presents a droopy, depressed appearance, and eats nothing or but very little; the fever is not high; the back is arched and their gait staggering; there is a cough, and the animal swallows with difficulty.

The respiratory mucous membranes are inflamed, the discharge from the nostrils sometimes tinged with blood is increased and accumulates at the openings. When the respiratory organs become generally affected

there is difficulty in breathing. They rapidly become weak and anæmic, and it is not uncommon for a swelling to appear under the jaw. In severe cases diarrhoea is a prominent symptom. Sometimes both the external and internal parts of the eye become inflamed; the lids are swollen and the eyes milky in appearance. Pneumonia and inflammation of the brain and its coverings are frequent complications. The duration of the disease is from a few days to several weeks. When recovery takes place in a few days, as it does in mild cases, the appetite improves, rumination takes place at more regular intervals, and the animal becomes more lively. If not cared for in a proper manner a relapse may occur. The prognosis is very serious, especially in lambs.

The changes in the tissue of the body will vary. In cases that have run an acute course the general changes are not marked. When the disease is complicated and the duration a week or more, various tissues and organs are affected. The principal changes seen in influenza are met with in the organs of respiration; the mucous membrane lining the air passage is of a deep red color and thickened; that lining the sinuses of the head is also involved; generally a portion of the lung tissue is affected by a catarrhal pneumonia, but in severe cases the pleural membrane as well as a large portion of the lung is affected; the coverings of the brain are inflamed and this state may extend to the other parts of the brain; the ventricles and the spaces between the membranes of the brain contain more fluid than normal; the mucous membrane lining the fourth stomach and intestines is sometimes thickened and inflamed. The general changes are as follows: Marked emaciation; the visible mucous membranes (that lining the eye and mouth) paler than normal; the muscular tissue pale; inflammation of the liver, kidneys, spleen, heart and lymph glands; bloody serous fluids in the body cavities and dark clotted blood in the cavities of the heart and large veins.

When the disease is present in a flock, the sheep should be carefully looked over every day and the sick animals separated from the healthy ones, given good nourishing food, comfortable quarters and good care. If the conditions under which the sheep are kept predisposes them to the disease, better quarters, well ventilated and free from draughts, should be provided if possible. Better results will follow if the medicinal treatment is directed by a veterinary surgeon. As different organs of the body are affected a variety of symptoms will present themselves necessitating different lines of treatment. The drenching must be carefully done or serious results may follow. Non-irritating drugs and those that can be given in small drenches are to be preferred. In the catarrhal form the following prescription is useful: Tincture of belladonna (two drams), tincture of aconite (one-half dram) and sufficient linseed oil to make a four ounce mixture. One tablespoonful is to be given three times a day. This treatment is best followed by tonics and expectorants. One tablespoonful of the following mixture given twice a day is beneficial: Tincture of gentian (four

drams), iodide of potassium (two drams) and a sufficient quantity of water to make a six ounce mixture. If diarrhoea is present one ounce of linseed oil with one dram of tincture of opium given two or three times a day will give good results. When the sheep's appetite is poor, well selected, choice food will often coax it to eat.

President Guthrie: We have heard Dr. Craig's address. Are there any questions that it is your wish to ask the doctor?

Dr. Quick: There is a great deal of annoyance along the line of disease of which Dr. Craig has spoken. Perhaps there is no animal on the farm as susceptible to diseases of the throat as the sheep, and we should know better what to do and how to do it promptly, as we would take up a case in the human family. I have found that a sheep that has a cold can be treated about the same as a man. I found that bromo-quinine has about the same effect on a sheep as it has on a man.

While I do not approve of spending much money or time administering medicines, I think we can rationally use a great many remedies to advantage. The main thing, however, is to give nature an opportunity, but if we could add a little more knowledge along this line, we could certainly do it to advantage. At one time a man on our place announced to me that we had hog cholera. I felt that I could diagnose the case, and found that it was not swine plague or cholera, but a little trouble that might be remedied if attended to, and I did so. We might have announced it as hog cholera and done ourselves injury. It is a good thing to give attention to all these remedies, when it comes from a reliable and scientific source.

While I am on the floor I should like to call attention to the efforts made by the Legislative Committee two years ago concerning proper protection for our flocks from disease. That committee consisted of Senator Guthrie, Dr. Bitting and myself. We turned ourselves loose, and our pocketbooks, too. We spared no time or money to endeavor to get a bill through for the benefit of sheep raisers, particularly, and live stock men generally. We had a big hill to climb. We did not dream of the influence that the members of the State Sanitary Board of this State would have. They realized that it would legislate some of them out of office, so they got their friends to come out strong against the veterinary bill, and it was defeated. Senator Guthrie has offered this bill again at the present session, and it has an opportunity to become a law, and, each one of you should go to your member and use your best efforts in behalf of this bill, and if there is any way in which you can assist Senator Guthrie, I trust you will do it. We want your assistance. We must have it. We want to stamp out scab and other diseases in this State. I trust that this bill will go through and hope that each of you will feel this same interest. Senator Guthrie left no stone unturned to pass this bill the last Legislature, and will work to get it through this session.

A Member: A good many of us have come up here to hear the question of diseases among the sheep discussed, and I for one am very anxious to hear it. We would all rather hear the other fellows tell what is the matter with their sheep, than tell what is the matter with our own. There has been more or less disease among sheep in my locality, and I should like to ask Dr. Craig if there is any remedy that he could suggest to be used among a lot of country sheep to assist nature—besides drenching.

Dr. Craig: There is no one remedy that can be used in treating sheep, for the sheep will present a variety of symptoms. Sometimes changes in the tissues of the body will be noticeable, sometimes the respiratory glands are affected, similar to an ordinary cold. Sometimes other organs are more or less affected. The mucous membrane linings are most frequently affected, and when they first begin to show symptoms very little attention is paid to it, but soon changes in the body increase, and when one of these sheep is post-mortemed, we see many changes in different organs. When the first symptoms appear, the attention should begin, and the sick ones should be carefully protected from changeable weather and kept from exposing themselves.

Mr. Robe: The trouble with sheep is that the flocks will be running out and the first thing we know the whole flock has gone to pieces. It seems to me that when this trouble comes up, we ought to know what to do. Don't you think it is more stomach or liver trouble?

Dr. Craig: No, sir; the changes of the body show no parasite of an animal nature, excepting rarely. It is very hard to always discover the first symptoms of a disease, and one is very apt to pass them by and not discover that the animal is sick until it is pretty well along. We cannot give any set remedies for influenza, but we can only say to take good care of your sheep, and if you should discover the disease in the first steps, put the sheep into good quarters and prevent exposure to changeable weather, and in this way give nature a chance. I mentioned a few remedies in regard to helping nature to get rid of the catarrhal form. We cannot lay down a large number of remedies to meet all emergencies, but those two methods I mentioned are good. The fact that this disease has run through the summer of the past year, proves it to be of an infectious nature. We have very little literature to read up on the diseases of the sheep. We find very little in the sheep books and papers. This disease may run on for several years and then we may see no more of it for years. It resembles in that respect influenza in horses that we are better acquainted with than in any other animal.

Mr. Roundtree: If I had a horse that was continually having colic, I would either trade him off or kill him. I have been handling sheep in Indiana ever since I was seventeen years old, and in the last three years

we have had more sickly, diseased lambs in the country than ever before. I have been watching and tracing those things very closely, and as far as influenza or other diseases are concerned, my experience has brought me to this point: You have bred them out of life. What you want to do is to inject into your herds strong, new blood. We have tested that, and as I said before, one fact proven is worth more than a ton of logic.

Secretary Plumb: We have had a considerable amount of this trouble with our Shropshires, and we placed the sheep at the disposal of the veterinarians, and had an expert in charge of them. They were subjected to experiment, and every effort was made to locate and discover a remedy, as we have certain other remedies for certain other diseases, but the results so far have been unsatisfactory. When cold weather came on the disease seemed to diminish. I can assure you that the work will be continued until we do get hold of something.

Mr. Vestal: The influenza that my lambs had was visible to the naked eye. The lambs commenced going off and we watched them. We brought the flock up and found a little lamb that was affected, and on examination we found white worms, alive and wriggling, and we went on down and found ordinary red worms in the large intestine, and in the stomach we found a half teacupful and killed them with gasoline.

Dr. Bitting: Influenza is an entirely separate and distinct disease from that caused by the stomach worm. One produces one disease, and the other another. It is just as distinct and separate a disease as grippe with humans. It is very probable that after this, it may leave and never come again. It may disappear and not return again for fifty or one hundred years. What produces it, we do not know. We have to separate this disease from many others seemingly the same.

Mr. Robe: You think it is not the same as the stomach worm?

Dr. Bitting: It is not the same disease. Sheep with influenza discharge at the nose, and will become lifeless and dull.

President Guthrie: The next subject on the program is on

HOW SHALL A YOUNG MAN ESTABLISH A FLOCK.

J. H. SKINNER.

Every work must have a commencement. The success of any undertaking depends to a greater or less degree on the beginning, and many times the difference between success and failure has been the beginning.

To be highly successful in any endeavor, a man must have a definitely fixed purpose; a definite object in view; an ideal to reach. He must not only see things as they are, but have insight and foresight enough to look into the future and get at least a glimpse of what his particular undertaking will be in ten, fifteen or twenty years ahead.

To be able to do this he must have a thorough knowledge of conditions, a practical understanding of the business, whatever it may be, and a determination to reach his ideal at all hazards. It is said of the late Philip Armour that his success in business was due largely to his ability to see future conditions, that other men, who were not so well informed, could not see. So it is with men in all phases of life. They must see ahead to be successful. Too many farmers, and would-be stockraisers, go into the business without a definite object in view, and without the information and understanding of conditions which should enable them to see what is ahead.

Many of us are familiar with the man who says, "I must get me a flock of sheep," just because his neighbor has a flock and makes money out of them. He has no definite object in view and does not stop to think of the time his neighbor spends reading sheep papers, nor does he take into consideration the time his neighbor puts in at night in lambing time. He does not see his successful friend's watchfulness.

I believe I am safe in saying that there is no other class of live stock which is given as poor care as sheep. Certainly there is no other which responds more readily to proper handling. And you will all say that none is so profitable under favorable conditions.

In order that a young man may establish a flock and be successful with it he must have some knowledge of sheep in general. He should be familiar with the habits of this class of live stock, and the more he knows of the methods of managing and handling a flock the more assurance he has of success. He should also have a liking for the business.

Then with a knowledge of his farm, and his conditions, and a definite purpose in mind, he should make a thorough study of the different breeds in order that he may select the one which is best adapted to his soil, locality and conditions, and certainly that which will serve his purpose to the best advantage.

You may ask, "How is he to get reliable information concerning the breeds?" If he goes to a fancier of any particular breed he will be told, that is the best, the only breed. If he goes to different ones he has just so many different opinions. I would say for him to get some reliable book on the breeds and then familiarize himself with flocks of the breed which promise to serve his purpose; attend sheep breeders' meetings, read sheep papers and learn all he can about them.

If he has had some experience, and has the money, he should get a few of the best ewes of the breed he decides on. If he is wholly new in the business, it will be wise to get a few of the best grades he can afford, keep-

ing his object in view all the while, and breeding toward that end, using the very best rams he can get; not being discouraged at failures at first, for there is no business that takes more patience than sheep breeding.

After awhile he will be able to buy and manage intelligently a pure bred ewe or two, and a little later the grades may be all replaced with pure bred, and he has a flock started. In my case, I began as a boy. I was scarcely old enough to have a purpose, but I did have an ideal, and have worked toward it ever since. My ideal to-day is not what it was then, however, because if we are to make progress, as we approach our ideal, we see another far beyond. When twelve years old, I took a fancy to sheep, perhaps because I enjoyed seeing the lambs play. I persuaded my father to buy a few ewes and soon traded him some pigs for an interest in them.

The beginning was five grade Cotswolds that were large, leggy and prolific, usually bringing two good, strong lambs. From this small number I have seen the flock increased to 40 and 50 several times. I first used grade Shropshire rams, and later registered rams, and to-day have on my father's farm a flock of ewes which are well bred, but not eligible to registry. Last year I added two registered ewes and they raised me three splendid ewe lambs. In two or three years I hope to have a registered flock.

We have a small farm, and long ago learned that a small flock is more profitable for me, as I can give them better care and attention. It now numbers twenty, and has reached the most profitable limit. Each year the older ones are sold along with any that may have had faults. I mark the undesirable ones at shearing time so as to make no mistake. In selling I have kept those which approach most nearly Shropshire form, and at present the flock is as good as many registered ones, and if form, quality and markings were the necessary qualifications, these sheep could be registered.

This small flock of sheep is the most productive capital invested on the farm. The first year the lambs paid for the ewes, and certainly the wool and manure paid for the care and feeding.

I usually sell the ram lambs on the market without castrating or docking, as with limited room it is not practicable to carry them over winter. The ewe lambs are carried over or sold at a premium for breeding purposes.

My lambs are dropped about the middle of March, as I prefer that they have grass almost as soon as they are old enough to nibble it. Besides, there is less danger of loss from cold and less care required.

Our pasture is a mixture of clover and timothy, with white clover gradually coming in. It seldom stands more than two years. The sheep run with the cattle, having the range of the pasture and plenty of good water and salt. If there are no shade trees in the field, I provide low shelters of boards or straw to protect them from the hot sun, and to enable them to protect themselves from flies.

After harvest they are turned into the stubble field, and later into the meadow, and in the fall go into a stock field, if I have one. In this way they require little attention until Christmas, when work is slack. Then they are given a good, dry shed, open on the south, and the run of a half acre lot. They are fed all the bright corn fodder they will eat, along with a small ration of oats and corn. When the pastures are frozen, I turn them out on bright days and thus they get needed exercise. As lambing season approaches the fodder is replaced with clover hay. I have never grown any quantity of roots, but am satisfied that they are a profitable food.

My sheep have been very healthy. I think due to the method of handling.

There is always a demand for good fat lambs, and I assure you that the young man who will devote himself to the sheep industry will find it a pleasant and profitable field.

President Guthrie: Gentlemen, if there is anything to bring out right here, I should like to stop long enough to say that I am very much interested in the matter of which Dr. Quick has spoken. You left this matter with us—Dr. Quick, Dr. Bitting and I—when we were talking about it two years ago, and while we have had your encouragement, I should like to have an expression from you at this time, on the subject of Bill 18 that has been introduced in the Senate.

Mr. Robe: Mr. Chairman, I move that we continue the same committee. I came up last session and tried to do something and I went to see our Representative last time and I will see him again. I move that the committee be continued. Motion seconded and carried.

A Member: There is only one point in this whole bill, it legislates the members of the present commission out of office. They don't get any more money. I don't ask for any better committee than we had last year.

Mr. Matthews: Let every man write to his Representative. Let us have a motion to that effect.

Professor Plumb: I move that Mr. Robe be added to this committee.

Mr. Roundtree: I move that the committee be increased to five, and that Professor Plumb be added to the committee.

Dr. Quick: Mr. Robe kindly assisted us on the committee, and very materially, too.

The President: The motion was to have Mr. Robe added to the committee, and now it is amended to add Professor Plumb. All who are in favor, say "Aye." Unanimous.

Secretary Plumb: Mr. Anderson intended to be here, but has sent a letter saying that he was suddenly taken sick, and requesting that I read his paper, entitled,

WHAT ADVANTAGES HAS SOUTHERN INDIANA FOR SHEEP HUSBANDRY?

W. B. ANDERSON.

In presenting this paper, the purpose is to call attention to a section of Southern Indiana, a part of which has been misused, so that the growing of agricultural products is no longer profitable, while other parts have remained in their primitive condition—excepting the removal of the valuable forest trees for lumber—and are now covered with treetops and logs, intermingled with an undergrowth of briars and bushes. This district usually falls to bring any income to its owner or any revenue to the State, and is, in reality, a burden, because the products of the farm are on the average inferior in quality and quantity to those produced on other farming lands of the State. Such are the conditions that the intelligent and energetic young people living there usually look for more promising territory or drift into other lines of industry, leaving behind a class having no public spirit and but little desire to keep peace with agricultural progress. Added to this class is another element consisting of itinerant log cutters, lumbermen, and coal miners, who add little to the elevation of social and political life.

The hilly portions of Southern Indiana were at one time thickly forested with valuable poplar and white oak timber. After the marketable timber had been removed, many acres were cleared and tended in grain crops and tobacco—a practice which led to rapid depletion of soil fertility. The old fields are now covered with briars and bushes, and deep gullies trace down the hillsides. The soil is worthless, agriculturally speaking, for the crop that is taken from it every four or six years does by no means pay for the expense of preparing the land and keeping up the taxes. Many acres of this land are held by large corporation and wealthy speculators, who hold them for the coal they are supposed to contain and pay no attention to the agricultural resources of their possessions. Other tracts have been purchased by large lumber companies, who have secured enough

lumber from the district to pay for the land twice over, and they now sell or lease it in small or large tracts, as the purchaser may desire, with little regard to price.

The fame of Kentucky as a live stock State does not overestimate the advantages of Southern Indiana for the growing of farm animals. Kentucky, with her climate, her grasses, her high, dry uplands, her valleys, with their bursting springs, finds her counterpart in this section of Southern Indiana.

The Kentucky blue grass, red top, timothy and orchard grass are almost natural products of this region. Red clover and cow peas grow luxuriantly, if given a good opportunity, and are great factors toward maintaining soil fertility. In the rich alluvial grounds of this district these grasses produce their maximum yields.

On the 24th of December, 40 acres of this land that had received good treatment; yet had been closely pastured, was supporting a comparatively large herd of fat, sleek cattle without any additional food whatever. Lying near this tract and adjoining it are barren tracts covered with briars and of very little value for any purpose. The excellent pasture facilities of the former tract are but an index to what the latter might be if it were properly cared for. While the sheep industry has received comparatively little attention here, such are the advantages that one who would intelligently consider the conditions would have a very prosperous outlook. The sheep scab, stomach worms, foot rot and other troublesome diseases, so prevalent in many sections, are almost unknown here. Most of the losses are due to bad management, and especially to the hunter's cur. In every shade, in every tramping spot, the sheep produces its own dust cloud to drive away the tormenting flies. Almost every valley has its spring of water in abundance. The high hills afford a suitable pasture in the wet season of the year, which is supplemented by the heavy growth from the bottom lands later in the season, when dry weather or drouth may come. Here may be found the cheapest labor in the State. Farm hands may be secured at the low price of 60 to 75 cents per day, the hired man boarding himself. Where board is furnished the price of labor ranges from \$12 to \$16 per month. The price of land varies according to location and improvements. Uncleared land sells at \$6 to \$12 per acre, the improved lands running from \$12 to \$15 per acre. Lease upon large tracts of company lands could probably be secured at very low rates, if taken for a number of years. The shipping facilities are of the best. A direct line passes through the territory from Louisville to St. Louis, and crosses other lines that afford fast shipment to Chicago, Cincinnati and Indianapolis.

The chief advantages of Southern Indiana for sheep husbandry consists in a high, dry, clay upland soil, suitable to a great variety of excellent pasture grasses; rather large tracts of land in one body; cheap lands; cheap labor; cheap building material; good shipping facilities and a healthful

climate. This part of Indiana has all the advantages of the Western ranch, with indeed very few of its disadvantages.

The introduction of live stock and the growing of fruit are the only hopes by which a portion of Southern Indiana may be able to share the prosperity of the State. This section by no means includes the entire portion of Southern Indiana. Almost every southern county has a large area well adapted to the cultivation of crops, and often yields of corn, wheat and hay are received that are among the highest yields in the State.

Indiana has no richer farms than are found in the valleys of the Ohio, White and Wabash rivers, yet almost every county contains acres of land suited only to pasturing purposes which would be ideal places of sheep husbandry.

President Guthrie: The last paper on the program is an address by Professor Plumb, who will talk to us on his experience

IN THE LAND OF THE CHEVIOTS.

PROF. C. S. PLUMB.

The border land between England and Scotland has a bloody record in early centuries, for here long waged the border warfare between Scotch and English. Smooth, grassy or heather capped mountains, reaching a height of nearly 4,000 feet, among which ripple beautiful streams of crystal water, straggle over considerable territory, through which passes the imaginary line dividing England and Scotland. These are the Cheviot hills. They are strikingly picturesque, and in a measure lonely and isolated. One may take the railway train at Tweedmouth and follow along up the historic and beautiful Tweed, with its ruined castles, until he arrives at Jedburgh, on the Jed, and there he will find himself at one of the gateways to the Cheviots. White, smooth-faced sheep have been in sight from the train for many miles, and now as one steps off at the railway station at Jedburgh, he sees that the hills on every side are populated with pure white sheep. Here and there is a little cluster of timber in the valley, or on the mountain side, but grassy, sheep covered hillsides and mountain tops greet the eye on every side. Jedburgh is an interesting town of less than 4,000 inhabitants, with the picturesque ruins of an old abbey built in part in the thirteenth century. It is situated on each side of the tumbling, brawling little river Jed, which is spanned by graceful stone bridges, and in the waters of which many a man and boy takes a try for trout. The Spread Eagle Hotel offers one first-class entertainment at

reasonable rates, and the genial Wm. Sword, his excellency, the Mayor, offers us the hospitality of the town and gives the writer and his Yankee friends a cordial welcome. Here in this little Scotch town Andrew Carnegie has already established one of his libraries.

The sheep about Jedburgh, and I am told the same applies to the vicinity of the other more important towns near the Cheviots, are mainly half bred, the result of crossing Border Leicester rams on Cheviot ewes. This crossing is for producing butchers' stock: And a very handsome sheep this cross produces. On the farm of Mr. Meins, about two miles from town, I saw some half breeds that were as handsome sheep as one can find, with all the sprightly carriage of the Cheviot.

On a day in late June, when Scotch mists made themselves occasionally manifest, the writer and two friends took conveyance back into the real heart of the Cheviots, to see the country and visit some of the great breeders. For a while the road wound up and down mountains, with fences or hedges on each side, with occasional villages. Gradually fences and hedges disappeared, houses occurred only at long intervals, and we entered into the midst of the Cheviots in all their loneliness. A bare roadway would stretch ahead, across which drifted Cheviot sheep, which became omnipresent. They were on the mountain tops, the sides, in the valleys, by the roadside, and everywhere. Streams of water coursed here and there, and grass seemed abundant on every hand. Occasionally a stone wall would show a boundary, and perhaps fence bars would cross the road, which we must let down to pass. Yet the scene was one of much beauty and full of interest to a student of sheep husbandry. Here and there a neat cottage or attractive farm home would be seen located on a hillside. But as a whole, there is a great open range country, most sparsely settled.

Back in these hills are famous breeders, and I was ambitious to see John Elliott, of Lower Hindhope; George Douglas, of Upper Hindhope, and J. R. C. Smith, of Mowhaugh, all extensive breeders and leaders in Scotch Cheviot ranks. Perhaps no one in Britain has had such success as a showman of Cheviots as John Elliott, and his father before him had great fame in the same field. But these men were breeders as well as showmen.

Nearly all the sheep bred back in the mountains are of pure blood, but very few persons raising half breeds. The sheep are run on the hills the year round, and excepting they are to be shown or sold for breeding rams, none of the sheep receive other food than the native mountain grasses. Some roots are grown, and these and some grain fed the show sheep, and a limited amount of hay is cut to be used for winter feeding, should occasion arise, but as a rule, even in winter, the common sheep secure their food from the hillsides. If the snow is too deep, then some hay may be drawn to them. The only protection the animals may get in the severest of weather, will be the shelter of a hillside, or within an en-

closure called a "stell." This "stell" is a circular stone wall, perhaps four feet or so high, with a small doorway on one side large enough to pass the sheep through. It has no roof. This is usually located on a sheltered hillside, and in this perhaps 600 sheep may be stored during severe storms, where they get slight protection from wind and snow. Nowhere else in my extended travels have I seen these "stells." The Cheviot winters, as a rule, are not extremely severe, and only occasionally does snow occur deep enough to prevent sheep securing food.

The sheep range the mountains under the supervision of the shepherds, who use Collie dogs extensively. Never have I seen the dog put to such intelligent work as in these Cheviot hills. There are many large flocks, and the dog is of inestimable service. In driving through the mountains, here and there across country would be seen a shepherd and a dog or two driving or rounding up sheep. It was no uncommon sight. These were not the fancy Collies that one sees in the dog shows, but were intelligent looking, rough coated, plain appearing dogs of perhaps sable or black, or white or a mixture.

The shearing usually begins late in June, and at the time of my visit shearing was generally in progress. John Elliott keeps some 5,000 sheep, on five farms, and George Douglas has some 6,000, so one can realize that shearing is no small business here. I was told that an average fleece would perhaps weigh four pounds. All the work is done by hand shears, and everything proceeds in a most quiet and orderly fashion. The large farms have wool rooms, and usually women take the fleeces from the men as fast as removed from the sheep, and these are straightened out, rolled up correctly, and packed away. As soon as a sheep is shorn, a boy or man stamps a letter or set of letters on the side of the animal, using hot gas tar, and the animal is then turned into a yard with the other sheep that are shorn. A good man will shear 80 a day, and he may be paid about \$1.25 a score for shearing, or be paid in some other way. In every case that I saw but one, the shearing was done under cover in sheds.

The sheep are washed in brooks two or three separate times, and then ten days later shearing begins.

In Scotland, Cheviot ewes are not registered, only the males being recorded. However, the best breeders make select drafts of breeding ewes from their flocks, and mate select rams to these, keeping a record of the matings of each lot. On these hills they usually use one ram to about 60 ewes. The general flocks are divided into pastures, or as they term them, "hirsels." These breeding ewes are selections from each hirsle. One prominent breeder told me that he usually bred his ewes till five years of age, and if a fine breeder, as long as they would breed. He had bred them for thirteen years.

The ewes begin to lamb about the middle of April, and the lambs in some localities get weaned in July.

These people state that there is no change in the Cheviots in popularity. It has been bred on these hills for over a century, and still it is the only breed that can be said to exist there. Elliott thinks no other breed will do in these free stone hills. Black Face Highland sheep will do better than the Cheviot, however, on the heather on the blackish soils up on the more exposed and elevated points. And so one finds the Black Face Highlander more in the lake district and in the high, heather-clad Scotch mountains.

There is no other industry in these hills but sheep growing. There are no farm crops worth mentioning. A little patch of ground near the house or barn may grow vegetables for the family, or roots and a bit of grain for the sheep, but as a whole it is a region devoted to sheep and grass only.

These Cheviot breeders that I saw live in homes of a most attractive character. They are of native stone, and I always found the interiors furnished with much comfort and taste, far in advance of what is ordinarily found in the better American farm homes. One would not expect such comfort in so isolated a mountain country. And these people we found full of hospitality, offering us their own with the freest hand and doing everything in their power to make us enjoy a visit among them. We certainly shall long have occasion to remember with much pleasure the entertainment we received in the homes of Messrs. Elliott, Douglas and Smith.

The Cheviot hills are eternal, and no matter what its fortunes may be in other parts of the world, the Cheviot breed of sheep is destined to live and endure through the years to come in its own beautiful hills. It long since owned the right, for it is a case of the survival of the fittest for the condition there.

The President: I will call on Brother Keim to lead in the general discussion on

THE SHEEP SHEARING MACHINE; ITS ADVANTAGES AND DISADVANTAGES.

Mr. Keim: I do not know whether my experience is sufficient to enable me to say anything valuable or not. In 1898, when I saw the sheep shearing machine advertisements, I bought one and used it. It was a machine made by the Chicago Flexible Shaft Company. It was simply a metamorphosed horse clipping machine, and not at all practicable for sheep shearing. I nearly killed myself to make it do practical work, and so expressed myself to the manufacturers of the machine. They sent me a new one, which I never unpacked, because I had shorn my sheep. This year they sent me a new model, entirely different from the old one, which I think is more practical. The representative was Mr. Hawtree, who came

to the house on the eleventh day of this month. We went to the barn and tried it on a sheep, and in consequence, I now have one sheep wearing an overcoat. The machine did very nice, neat work, and seemed to run very evenly, but it was entirely different from the old machine. I believe this one to be practical. I am going to have one before very long, and will tell you more about it next year.

A Member: We bought one of the same kind as Mr. Keim speaks of. We sheared two sheep with it. Mr. Pearson undertook to shear seventy-five sheep, but after a week's trial, sent it back, and he is still corresponding with the company. It might shear a sheep or two all right, but I would not invest again, because it was unsatisfactory.

Mr. Ensminger: In our county of Hendricks, several men corresponded with a Chicago firm, and they came to me and said, "Ensminger, what do you say about sending up there and getting a machine?" I said, "Send and get it." They sent the money and got one. I asked them particularly about it and they said it was a success. They said they would guarantee a pound and a half more wool, and that they could clip it just as close as they could get it. They are well pleased with it in our county.

A Member: Mr. Osborn is a practical sheep man, and we bought a machine which did pretty well for a while, but it went back on us and we never could make it work again. We sent it to Chicago and they repaired and returned it, but it never did any good after that. It was a failure.

Mr. Matthews: They had a machine at our house, but it didn't seem to be any account. Last spring Dr. Quick had a machine there, and let me say there is nothing like having a man who understands using a machine. I don't know the make of it, but it came from Chicago. It seems to me that the knives get dull very soon.

Mr. Roundtree: I have never sheared my own flock with a machine, but I saw an improved Flexible work at Chicago in December and it sheared very well. I have bought sheep in our county shorn with the clipper, and if I were buying a drove of sheep that was clipped by an experienced man, it would add ten to fifteen cents per hundred in the price of the animal, as he goes to market. It adds so to its appearance, the wool being perfectly even. Take the average sheep shorn in the old way, and six weeks' growth will not make the wool surface smooth. I think it a great advantage. Some one has said that you could save from one to one and a half pounds of wool, but I don't believe you could save more than one-fourth or one-half that at most, but it is not only best for the appearance of the sheep, but it is more humane.

Judge Cowgill: What kind of power is used with these machines?

Mr. Roundtree: I would not have a hand power machine, but steam power. There is a portable machine which costs probably five hundred dollars. The time will come when men in a neighborhood will invest in one machine, which will go over the neighborhood and shear all the sheep.

Dr. Quick: So far as our experience goes, the machine has not been satisfactory. There has been too much breakage, and sending to Chicago for supplies, and the greatest difficulty, perhaps, is in getting a man who has enough mechanical genius about him to make the machine go. We found a man who took hold of the machine and got the wool off a Rambouillet just as quick as it could possibly be done. It takes a man with determination, one who will keep on trying, if he fails, to go on working at it. If you can take hold of it properly, I believe it will finally be a success, but if it is left in the hands of hired men, as is often done, it is certainly a mistake. They throw the shears down, break a tooth, perhaps, and cause endless trouble.

[Note by the Secretary: With the exception of the statement made by Mr. Keim, the remarks of the speakers refer to the old discarded type of shearing machine. The 1901 model seems to do very excellent work, and the hand-power machine is easily driven by a man or good-sized boy.]

The Committee on Nominations submitted the following names as officers for the ensuing year:

For President, ex-Governor Mount.

For Vice-President, H. H. Keim.

For Secretary, Prof. C. S. Plumb.

For Treasurer, C. A. Phelps.

The motion was made, seconded and carried that the report of the committee be accepted.

The Executive Committee nominated for the next year consisted of Mr. Charles Roundtree, Dr. Quick and Mr. Cunningham.

A motion was made by Professor Plumb to combine Secretary and Treasurer into one office, this subject to be considered at the next meeting.

Mr. Phelps: I move that we leave this matter to the Executive Committee.

The motion was seconded and agreed to.

Adjournment.

APPENDIX.

DOG AND SHEEP LAWS.

Chapter CXIX of the laws of the State of Indiana, passed at the sixtieth regular session of the General Assembly for 1897, contains the following sections of importance to sheep owners, from an act approved March 6, 1897, "regulating the taxing of dogs and for the protection of sheep, cattle, horses, swine and other live stock and fowls," etc.:

Sec. 8. Any dog that is known to have killed, maimed, chased or worried any sheep, cattle, horses, swine or other live stock, or fowls, unless accompanied by his master or some other person, may be killed by any person, and any person who shall own, keep or harbor any dog, after he knows that such dog has killed or maimed, chased or worried any sheep, cattle, horses, swine, other live stock or fowls, shall be fined in any sum not less than ten nor more than fifty dollars.

Sec. 11. All money derived by the taxing of dogs by the Township Assessor or Township Trustee as provided by this act, shall constitute a fund known as the "Dog Fund," which shall be used for the payment of damages sustained by owners of sheep, cattle, horses, swine and other live stock, or fowls, killed, maimed or damaged by dogs, within any township of the State of Indiana. Each Township Trustee shall collect all fines belonging to his township from the different courts, where such fines have been assessed and paid: Provided, That no damage shall be assessed or paid on sheep except where individual damage exists or is known.

Sec. 12. The owners of sheep, cattle, swine, horses and other live stock or fowls killed, maimed or damaged by dogs shall, within ten days from the time thereof, report to the Trustee of his township, under oath, in which he shall state the number and age, as he believes, and the value of such stock or fowls so killed or damaged, and the damages sustained on account of such stock or fowls killed or maimed, in which affidavit he must be joined by two disinterested and reputable freeholders, and any person or persons who shall make any false statements of such damages, shall upon conviction be fined in any sum, not exceeding \$100, to which shall be added imprisonment in the county jail for any term not exceeding thirty days: Provided, however, That no appraisement shall exceed the actual cash value for which such live stock or fowls would have sold if placed on the market at the time such damage was sustained: Provided, further, That if any Township Trustee deem the appraisement of such live stock or fowls so killed or maimed to be excessive, he shall tender to the owner or owners, or credit upon his books such amount which in his judgment is equal to the injuries sustained, and if any action at law by the owners thereof for the recovery of such damages, said owners shall fail to recover a judgment exclusive of costs for an amount greater than the amount so tendered the defendant shall recover costs of such suit.

FORTY-FIFTH ANNUAL MEETING
OF THE
Indiana Swine Breeders' Association,
WEDNESDAY, JANUARY 19, 1901.

The twenty-fourth annual meeting of the Indiana Swine Breeders' Association met in regular session Wednesday, January 19, 1901, in Room 12, State House, Indianapolis, Indiana, President L. L. Moorman in the chair.

"How Could the Swine Department at Fairs be Improved?" was fully explained by James Gartin, of Burney, Ind., and discussed by W. A. Smiley, of Milligan, Ind.

Professor Plumb, of Purdue University, read a very interesting paper on the different feeds used at Purdue and the buildings for swine.

Treatment and care of the brood sow from time of service until pigs are weaned was fully explained by I. N. Barker, of Thorntown, Ind., and discussed by several breeders.

"Why I Prefer the Durocs to Other Breeds" was handled by Dr. W. J. Quick, of Brooklyn, Ind. This paper brought out a sharp discussion from several of the breeders of different kinds.

Geo. W. Jessup, of Rockville, Ind., read a paper on the subject "How to Reduce Show Animals After the Fair Season." Mr. Jessup fully explained his method of reducing show animals so that they might still be of use as breeders.

On motion of I. N. Barker, Prof. C. S. Plumb was made an honorary member of this Association.

Moved by F. F. Moore that the swine breeders take a day for their meeting, instead of half a day, as heretofore. Motion carried.

The officers for 1901 are:

President—R. N. Hindeman, Gings, Ind.

Vice-President—Allen Beeler, Liberty, Ind.

Secretary—Lucien Arbuckle, Hope, Ind.

Treasurer—A. S. Gilmour, Greensburg, Ind.

This Association has a membership of seventy, comprising all the prominent swine breeders of the State.

LUCIEN ARBUCKLE,
Secretary.

ELEVENTH ANNUAL REPORT
OF THE
Indiana State Dairy Association.

ANNUAL MEETING

HELD AT

Hobart, Lake County, December 5-6, 1900.

(Stenographic Notes by X. A. Boomhauer.)

Edited by H. E. VAN NORMAN, Secretary.

OFFICERS OF THE INDIANA STATE DAIRY ASSOCIATION.

PRESIDENTS.

C. S. Plumb, Lafayette, Tippecanoe County.....	1891-1893
Bartlett Woods, Crown Point, Lake County.....	1893-1894
W. S. Commons, Centreville, Wayne County.....	1894-1895
C. S. Plumb, Lafayette, Tippecanoe County.....	1895-1896
O. A. Stubbs, Lewisville, Henry County.....	1896-1897
S. B. Woods, Lottaville, Lake County.....	1897-1898
J. J. W. Billingsley, Indianapolis, Marion County.....	1898-1899
C. B. Benjamin, LeRoy, Lake County.....	1899-1900
C. S. Plumb, Lafayette, Tippecanoe County.....	1900—

VICE-PRESIDENTS.

Chas. C. VanNuys, Franklin, Johnson County.....	1893-1894
J. M. Knox, Lebanon, Boone County.....	1894-1895
W. S. Commons, Centreville, Wayne County.....	1895-1896
Chas. B. Benjamin, LeRoy, Lake County.....	1896-1897
O. P. Macy, Mooresville, Morgan County.....	1897-1898
G. W. Drischel, Cambridge City, Wayne County.....	1898-1899
J. V. Shugart, Marion, Grant County.....	1899-1900
J. M. Knox, Lebanon, Boone County.....	1900—

FIRST VICE-PRESIDENT.*

D. H. Jenkins, Indianapolis, Marion County.....1891-1892

SECOND VICE--PRESIDENT.*

Mrs. Kate M. Busick, Wabash, Wabash County.....1891-1892

THIRD VICE-PRESIDENT.*

C. B. Harris, Goshen, Elkhart County.....1891-1892

SECRETARY-TREASURER.

Mrs. Laura D. Worley, Ellettsville, Monroe County.....1891-1893

W. S. Commons, Centreville, Wayne County.....1893-1894

H. C. Beckman, Brunswick, Lake County.....1894-1897

C. S. Plumb, Lafayette, Tippecanoe County.....1897-1898

H. E. Van Norman, Lafayette, Tippecanoe County.....1898—

OFFICERS AND MEMBERS OF THE INDIANA STATE DAIRY
ASSOCIATION FOR 1901.

C. S. Plumb, President, Lafayette, Tippecanoe County.

J. M. Knox, Vice-President, Lebanon, Boone County.

H. E. Van Norman, Secretary-Treasurer, Lafayette, Tippecanoe County.

EXECUTIVE COMMITTEE.

C. S. Plumb, J. M. Knox, H. E. Van Norman, Samuel Schlosser, Plymouth; A. J. Newsom, Valley Mills.

MEMBERSHIP LIST.

ANNUAL MEMBERSHIP.

The following persons have paid one dollar into the treasury for membership in the Association for 1900 since the publication of the last report:

<i>Name.</i>	<i>City or Town.</i>	<i>County.</i>
Betts, Mrs. C. M.....	Hillsdale, Mich.	
Carlisle Creamery Co.....	Carlisle.....	Sullivan.
Deedsville Creamery Co.....	Deedsville.....	Miami.
Dyer Creamery Co.....	Dyer.....	Lake.
Hagerstown Creamery.....	Hagerstown.....	Wayne.
Haven, David.....	Dowagiac, Mich.	
Hungate, M. L.....	Hooker.....	Washington.
Johnson, H. L.....	Prairie Creek.....	Vigo.
Lamont, Chas.....	Joppa.....	Hendricks.

* In 1893 the offices of first, second and third Vice-Presidents were abolished.

<i>Name.</i>	<i>City or Town.</i>	<i>County.</i>
Mondamine Meadows Cr'y.	Fort Wayne	Allen.
Penrod, J. F.	North Liberty	St. Joseph.
Poplar Ridge Creamery	Poplar Ridge, N. Y.	
Rotermund, H. F.	Bemis, Ills.	
Schlosser Bros.	Bremen	Marshall.
Schlosser Bros.	Hanna	Laporte.
Wilson, T. C.	West Lafayette	Tippecanoe.

The following persons have paid one dollar into the treasury of the Association for 1901:

<i>Name.</i>	<i>City or Town.</i>	<i>County.</i>
Anderson, O. C.	Mentone	Kosciusko.
Banks, N. P.	Hobart	Lake.
Barker, H. N.	Westfield	Hamilton.
Beckman, J. N.	Brunswick	Lake.
Bean, John	Richmond	Wayne.
Benjamin, C. B.	LeRoy	Lake.
Blood, F. J.	Chicago, Illinois.	
Burnside, T. C.	Liberty	Union.
Brown, Mrs. Jas.	Hobart	Lake.
Bullock, Geo.	Ainsworth	Lake.
Carey, Harvey	Wheeler	Porter.
Carey, Henry	Wheeler	Porter.
Chamberlin & Son, D. J.	Lafayette	Tippecanoe.
Christ, John	Washington, Illinois.	
Chubbuck, E. J.	Chicago, Illinois.	
Clindon, S. D.	Hobart	Lake.
Coyne, D. J.	Chicago, Illinois.	
Craft, F. G.	Liberty	Union.
Dorman, John T.	Hobart	Lake.
Drischel, Geo. W.	Cambridge City	Henry.
Fifield, Z. H.	Palmer	Lake.
Furnas, R. W.	Indianapolis	Marion.
Gruel, John	Hobart	Lake.
Gallagher, T. F.	Chicago, Illinois.	
Hack, J. M.	Crown Point	Lake.
Hardesty, Mrs. A. R.	Hobart	Lake.
Harris, Warren	Wheeler	Porter.
Hart, Mrs. Henry	Wheeler	Porter.
Harvey, J. H.	Carmel	Hamilton.
Hillman, H. J.	North Judson	Starke.
Holloway, Silas	North Manchester	Wabash.
Husselman, Cal	Auburn	Dekalb.
Irwin, Mrs. J. C.	Bourbon	Marshall.
Johnson, Mrs. Chas.	Ross	Lake.

<i>Name.</i>	<i>City or Town.</i>	<i>County.</i>
Krieter, F	Lottaville	Lake.
Knox, J. M.	Lebanon	Boone.
Lafrize, Ezra	Liberty	Union.
Larson, John	Hobart	Lake.
Lockridge, A. L.	Indianapolis	Marion.
McMahan, H. F.	Liberty	Union.
Meyer, Otto	Armour	Lake.
Mundel, Jas	Hobart	Lake.
Newby, Herbert	Spiceland	Henry.
Newsom Bros	Valley Mills	Marion.
Owen, E. V.	Liberty	Union.
Parker, M. C	Hobart	Lake.
Piepho, Geo	Brunswick	Lake.
Rhodes, Louis	Hobart	Lake.
Robbins, Elmer	Liberty	Union.
Robbins, Mrs. L. H	McCool	Porter.
Robbins, J. S	McCool	Porter.
Roper, Phillis	Hobart	Lake.
Ringwood, G. H.	Oxford, Ohio.	
Schlosser, Phil	North Liberty	St. Joseph.
Schlosser, Wm	Bremen	Marshall.
Schlosser, Geo	Bremen	Marshall.
Schlosser, Frederick	Bremen	Marshall.
Schmal, Alf.	Brunswick	Lake.
Schnabel, F. T	Hobart	Lake.
Shugart, Mrs. J. V	Marion	Grant.
Shugart, J. V	Marion	Grant.
Shaffer, T. A	Hagerstown	Wayne.
Schwegler, W. G	Lafayette	Tippecanoe.
Smith, A. J	Hobart	Lake.
Smith, C. E.	Ainsworth	Lake.
Sykes, Wm	Hobart	Lake.
Tappan, Geo. L.	Liberty	Union.
Van Norman, H. E.	Lafayette	Tippecanoe.
Von Voigt, Otto	Ft. Wayne	Allen.
Warner, J. C	Wanatah	Laporte.
Welborn, M. T. J	Bridgeport	Marion.
Wilcox, W. I	Palmer	Lake.
Wildman, C.	Deedsville	Miami.
Willing, H. H	Wheeler	Porter.
Wilson, D. W.	Elgin, Illinois.	
Wolf, Martin	Wheeler	Porter.
Woolen, G. V	Indianapolis	Marion.
Woods, Bartlett	Crown Point	Lake.
Woods, S. B.	Lottaville	Lake.

LIFE MEMBERS.

<i>Name.</i>	<i>City or Town.</i>	<i>County.</i>
Boyd, Jas. A.	Cambridge City	Henry.
Commons, W. S.	Centreville	Wayne.
Drischel, G. W.	Cambridge City	Henry.
Ellison, T. E.	Fort Wayne.	Allen.
Plumb, C. S.	Lafayette.	Tippecanoe.
Schlosser, Sam'l.	Hanna	Laporte.

HONORARY MEMBER.

C. B. Harris, United States Consul, Nagasaki, Japan.

SUMMARY.

Active members.....	95
Life members	6
Honorary member.....	1
Total.....	102

COUNTIES REPRESENTED

Allen.	Lake.	St. Joseph.
Boone.	Laporte.	Sullivan.
Dekalb.	Marion.	Tippecanoe.
Grant.	Marshall.	Union.
Hamilton.	Miami.	Vigo.
Hendricks.	Porter.	Wabash.
Henry.	Randolph.	Washington.
Kosciusko.	Starke.	Wayne.

ARTICLES OF ASSOCIATION OF THE INDIANA STATE DAIRY ASSOCIATION.

(As amended December 7, 1899.)

Article 1. The name of this Association shall be "The Indiana State Dairy Association."

Art. 2. The officers of this Association shall consist of a President, Vice-President and Secretary-Treasurer, and an Executive Committee, consisting of the President, Vice-President, Secretary-Treasurer and two others elected by the Association. The Secretary is authorized, whenever necessary, to employ an assistant secretary of his own appointment, to assist at the annual meeting, who shall be paid for his services as the Executive Committee may decide. A committee of two, to audit the Secretary-Treasurer's accounts shall be appointed by the President at each annual meeting.

Art. 3. The officers shall be elected to serve one year, or until their successors have been elected.

Art. 4. The regular annual meetings shall occur at such time and place as may be designated by the Executive Committee, or by majority vote of the Association at the annual meeting.

Art. 5. Any person can become a member of this Association for one year by the payment of a fee of one dollar. Upon the payment of ten dollars, a person may become a life member. Honorary members not to exceed five may be elected, but said election is not to hold for over two years, excepting by re-election.

Art. 6. The President shall have power to call a special meeting at such time as in his judgment the interests of the Association demand.

Art. 7. The Executive Board shall have power to transact all unfinished business.

Art. 8. The Treasurer shall be the custodian of all the funds belonging to the institution, and pay out the same on the order of the President. The Treasurer shall also furnish sufficient bond, as determined by the Executive Committee, to guarantee all moneys owned by the Association, handled by him, the said bond to be deposited in such national bank as may be designated by the Executive Committee.

Art. 9. The officers of this Association shall perform such duties as usually devolve upon officers of similar organizations.

Art. 10. The President and Secretary shall each be allowed out of the general fund an amount equivalent to their actual expenses while attending Association meetings. When the Association receives State aid the Treasurer is authorized to meet the expenses of the Executive Committee in all cases of called meetings where executive business is transacted.

Art. 11. These articles may be amended by a majority vote of the members of the Association present.

PROCEEDINGS OF THE ELEVENTH ANNUAL CONVENTION OF THE INDIANA STATE DAIRY ASSOCIATION.

Hobart, Ind., Wednesday, December 5, 1900, 9:30 a. m.

The Indiana State Dairy Association was called to order by the President, C. B. Benjamin, of LeRoy.

The President: Mr. Conroy is unable to be present this morning, so we will have the address of welcome this evening. Mr. Newsom being the first person on the program, we will hear him now.

INFLUENCES WHICH IMPAIR THE QUALITY OF MILK AND CREAM.

A. J. NEWSOM, VALLEY MILLS, MARION COUNTY.

When we speak of influence we usually refer to some hidden power exerted for good, but in this case we use the term to denote something which tends toward that which is not good; something which impairs the quality, so we may say influences may be exerted for good or bad.

We are liable to notice some influences for the bad in others or other things, while those over which we have control pass by unobserved.

Influences for the bad are apparently more far-reaching than influences for the good. A thousand horses may be driven to Indianapolis every day without exciting more than passing comment; one runs away and kills a man, and all the newspapers in the city tell about that horse.

I may take butter to a hundred customers for years, and while it is good nothing is said. I take one bad lot, and ruin my trade which has taken so much time and pains to establish; and so I say, influences for the bad are more noticeable than influences for the good.

In the milk and cream business, as in other things, it behooves us to reduce the influences for the bad to the minimum.

Having thus seen that influences for the bad may be so detrimental, let us notice for a moment what some of the "influences which impair the quality of milk and cream" are.

The quality of milk and cream may be impaired by (1) the cow, (2) the pasture, (3) the stable, (4) the dairy building, (5) the attendant.

THE COW.

The cow herself may be the source of a great many influences which will not only spoil her own product, but that of the entire herd as well. Chief among these influences may be that of advanced lactation. There is a certain period preceding freshening in almost every milch cow when her milk can not be used in any form as human food. This period varies with different cows under different circumstances. With us the milk is refused at from six to eight weeks previous to freshening. A neighbor whose cows freshen in March and April is compelled to turn most of them dry about the last of November. The feeding of an unbalanced ration (largely corn) possibly has something to do with the trouble in his case.

Another source of trouble is lumpy milk; usually one-quarter of the udder alone is affected; the affected quarter is first noticed to be hard and feverish; the milk flow is reduced. At the next milking the swelling may be gone, but the milk is lumpy, being milked with difficulty. The trouble may pass away in a day or two or may last a week. Ropy milk is a much less frequent source of trouble, though it is very annoying when it does appear.

The Cornell Experiment Station is investigating the causes of ropy milk, so we hope to know more about it in the near future.

THE PASTURE.

We are all familiar with the influence of the ragweed upon the quality of milk and cream. Frozen clover eaten by the cow a short time before milking has spoiled our coffee more than once. If the cow is roguish and visits your neighbor's onion patch, she may influence the quality of the entire output of a creamery.

Our creamery will not take cream from cows that pasture on rye. It was not until recently that they would accept the product of silage-fed cows—if they knew it. Silage, when not properly used, may cause trouble.

THE STABLE.

The stable is probably the home of a larger variety of odors that have a bad effect upon the quality of milk and cream than any other place upon the average dairy farm. Here bacteria, good, bad and indifferent, thrive and infect the milk to such an extent that its future usefulness is often impaired. The milk, being warm when drawn in the stable, is a fine absorbent of all odors.

THE DAIRY.

The dirty dairy building or dairy utensils are a constant menace to the health of the consumers of milk and cream. Only recently I learned

of a case where a careless attendant placed milk in a can that had not been properly washed. After a short time the milk was fed to young children. Ptomaine poisoning had developed and for several days their lives hung in the balance.

The creamery, like the dairy, should be clean at all times. Here where so much milk and cream are handled and so many to handle it a little indifference may cause no end of trouble. The shipping cans are usually cleaned on the inside, but often the lids and outside are forgotten. There may be some reason for leaving the outside of the shipping cans dirty, as the trainmen always "borrow" from a can that is clean on the outside. The grocery store is the final dispenser of milk and cream to a certain extent.

I have seen nice Jersey milk that had passed all the places I have mentioned without becoming tainted placed in the grocer's ice box alongside of limburger, strong country butter and fresh (?) meat. No wonder the formaldehyde-preservation-freezing combination gets in its work.

THE ATTENDANT.

I am about to forget the attendant—the person that milks the cow. He may, by a combination of clubs and cuss words, keep the cow in such a fever of excitement that her milk will have a feverish odor that will not enhance its value in the least. The attendant may have certain habits which would not be conducive to the production of a gilt-edge article. Fancy him milking with unwashed hands and a last year's pipe in his mouth.

REVIEW.

In reviewing, it might not be out of place to mention some influences which would improve the quality of milk and cream.

The cow should be kept healthy and treated kindly; her milk should not be used too near calving time; feed her a balanced ration. If you must pasture ragweeds or onions, take the cows off at noon and give them something that will not taint the milk.

"Cleanliness is next to godliness," is a motto that the dairyman should observe everywhere, and the stable is a good place to begin. It should be well lighted and ventilated. Odors must be prohibited at milking time. The dairy building and all utensils must be kept clean. A dry, airy, cool dairy building is to be preferred to a warm, damp and dirty milkhouse. We might sum it all up in the words, feed good food and keep clean.

DISCUSSION.

President: By way of introductory, I see Mr. Newsom knows whereof he speaks. He is engaged in making butter. Those of you who read the *Guide* know of the Newsom boys. His argument is now open for questions and criticism, and you should make use of the time.

Mr. Smith: I would like to ask what objection there is to rye for pasturage?

Mr. Newsom: The creamery people at Indianapolis claim that rye flavors the butter, and they object to it on that account.

Mr. Willing: What will take away color and give color to milk?

Mr. Newsom: I don't believe that I am able to answer that question.

Mr. Holloway: I think rye will give color to it.

Mr. Willing: What color?

Mr. Holloway: Yellow color. That has been my experience, any way. I have had no particular detrimental results or disadvantages from pasturing rye that I know of. I have also heard it said that plenty of sunlight in the stable gives color to milk.

Mr. Woods: What color?

Mr. Newsom: Well, in the springtime when the grass is of a luxurious growth the milk seems to be of a yellow color, while on dry feed in winter it is lighter in color; but then I am not able to state whether that has any more effect on the color than the cows being fresh, as they are more apt to be fresh in the spring, and that may have some influence.

Mr. Woods: What is your opinion as to whether clover will help color the milk?

Mr. Newsom: I am not able to answer that question.

Mr. Woods: I would like to ask if you include silage as a doubtful ration? I know they did at one time, but I don't know whether they do now or not.

Mr. Newsom: I never did. Our creamery used to refuse milk from silage-fed cows. We built a silo and sent in our cream and they didn't know anything about it. This year they are not kicking at all.

Mr. Woods: We fed silage for some time and shipped to different men, and one of them objected to the milk; said he could smell the milk. The morning's milk was all right, but the night's wasn't. We then commenced feeding after milking in the morning and after milking at night, and it was all right. It is the same way with any feed, I think. If we give a cow a heavy feed or have them in a good pasture of rye, they get full of green rye before milking and it may taint the milk. But by feeding after milking it does not affect the milk any. One of the causes of milk smelling is where the odor of the stable gets into the milk; before it gets cool it absorbs the odor.

President: Is there anything further? There are other good points that ought to be discussed.

Mr. Shugart: I think you will find it a great advantage to cool the milk immediately after it is drawn from the cows.

Mr. Woods: Is it your opinion it can be aerated out?

Mr. Newsom: I think it can to a certain extent. We always prefer keeping the odor out of the milk. Of course some slight odor gets in. The natural odor from the cow might be aerated from the milk and cream. We prefer keeping odors out of the stable and away from the milk.

Mr. Woods: My brother was shipping milk made from rye pasture and the milkman complained of it. He stopped feeding and there was no more complaint. He claimed that while aerating he could smell a strong, rank, green rye flavor. It proved in that case that some of it can be aerated out of the milk, if not all.

Mr. Woods: Do you aerate before separating?

Mr. Newsom: No, sir. We aerate the cream. We ship the cream to Indianapolis. At present we aerate the cream after separating and the skim milk goes to the pigs. We don't care whether that is aerated or not.

Mr. H. H. Willing: Was there anything said in your paper about bad water affecting the milk? And does it not affect the life of the cattle? And the stables being built too near any ditch or drainage and having the wells near the stable so that the water becomes bad and the life of the cattle affected? I am in favor of cement floors.

Mr. Newsom: Anything affecting the health of the cattle would be detrimental to the milk and cream business, so we want to keep our cows healthy by giving them clean water and good feed and clean stables.

Mr. Woods: What is your experience feeding turnips?

Answer: Feed them after milking.

President: If there is nothing further we will take up the "Making, Handling and Selling of Milk," by W. G. Woods.

Mr. Woods: In the absence of my brother I have been asked to say something on his subject. We have got to keep steam up here some way, and I will do what I can. "Making, Handling and Selling of Milk." In the first place, if you are going to make milk, one of the necessary things is a good farm. Without a good farm and good land it is uphill business all the way. We want to get good crops and good milkers, but without

plenty to eat it is hard to make milk. That is one of the first essentials for a good farm. When you have a good farm, the next necessity is good cows, and next, a good man to run the farm, for there is plenty of hard work. It seems rather wrong to say anything about breeding cows in this meeting, but I am going to say something, and if you don't like it you must object to it. I am talking about shipping milk. The Chicago dealer will pay so much a can for it, and what we want is to get the can full. All we want is the can full of milk, and I find that the cows that will do that to my satisfaction are the Holsteins. We have got a herd that will make milk that will test 3.1 per cent., and that "goes," and that is all we care for. We have a standard price, so much a can for the milk, and you get no more if it is richer. If it is richer you can keep your demand better; that is all the advantage there is in it. They don't pay according to what the milk is worth, but pay according to the measure of it. To make these cows give milk, from my experience the cheapest and best feed is corn—corn the year round. Mostly corn; that is, the bulk of the feed should be corn, and pasture just as little as possible. We pasture from June to the last of July; then oats and peas become big enough to feed. We have two silos; they don't hold enough, and we are going to build another. We are going to have one to feed the cows from in the summer as well as in winter. In the spring as soon as we can we sow oats and peas, which make excellent feed, and are ready to cut the last of June or first of July. They are ready first, before anything else you can grow. We plant corn as early as we can; also sorghum. We feed peas and oats, and corn and sorghum. We tried feeding sweet corn, but we haven't fed any of it lately. It is very tender and makes a good variety crop. We feed our cows nearly the year round. We get from those cows on an average one can of milk from each $2\frac{1}{2}$ cows the year round, and last year 27 cows in all averaged 12 cans of milk. In caring for the milk we have the stables as clean as we can under the circumstances. We pump the water up with a windmill or tread power from deep wells, which gives them good, clear water. We turn them out in cold weather as little as possible, and only for a little exercise while we clean out the stables. We do not let them stay out long. We take the milk directly from the stables to the tank and cool it, and then we find the best market we can for it. I have been selling some to the near-by markets; men meet there and take it to East Chicago, and that I like better than shipping it. Most of our milk from this country goes from the farm over the railroad to the city of Chicago. We have an association in there that establishes a price and we all try to get it. We generally get it, though sometimes we don't. It seems to me that this dairy business is a scientific business, and has got to be followed on the line of good judgment and science or there is not much money in it. It is not a good business unless we follow it right. We must have good cows and feed them a balanced ration. Balance it right—meal, oats and bran. This gluten feed meal is the cheapest feed we can get to balance up the

corn. Good feed, a balanced ration and a good cow are essential to success.

Mr. Welborn: What would be your idea of the best way to conduct a dairy where the work has to be hired?

Mr. Woods: The best way to conduct it?

Mr. Welborn: Yes. Would you hire a man and pay him so much for the work, or would you give him an interest?

Mr. Woods: I don't know that I understand you.

Mr. Welborn: If you had a dairy and had to hire the work done, would you let him have a part of the proceeds, or hire him and pay him so much per month?

Mr. Woods: You don't want to run the business yourself?

Mr. Welborn: No.

Mr. Woods: Rent it; get some good man and rent it to him on shares.

Mr. Welborn: Then the next question would be, how would you get a good man?

Mr. Woods: Have him made to order. [Laughter.]

Mr. Stonnel: Speaking of selling milk to the city trade, don't you think for a series of years that when the farmer turns the milk to the creamery that there would be more profit? You didn't mention the losses in shipping milk. And you certainly use many shipping cans, and lose a great many, don't you? Don't you think for a series of five, eight or ten years that it would pay a farmer better to send his milk to the creamery than shipping the milk would?

Mr. Woods: I do not think it would.

Mr. Stonnel: If the farmer should put himself in shape to raise calves on the skim milk and follow it systematically in a businesslike manner for a series of years, I am inclined to think that he will have less worry than by shipping the milk, though there are not so many cans lost now as there used to be, and of course not so much money lost in that way.

Mr. Willing: What is your understanding as to the per cent. of protein in bran?

Mr. Woods: I can not recall the figures now. I think the report in the *Dairyman* is twelve to fourteen per cent. It varies a great deal. Gluten feed usually runs from about twenty-four to twenty-six. Gluten feed can be obtained from the starchworks in our town at \$13 a ton.

Mr. Willing: Is it in the dried form?

Mr. Woods: Yes, sir.

Mr. J. M. Knox: Brother Woods speaks of sending milk to Chicago. We don't all have this Chicago market. A great many have to depend on the local trade, and where we do, we expect to get some cream. We don't want a three per cent. milk. They are not suited with it in our country. We can't run a dairy unless we have got the Jersey blood. We have to have not only the color but the fat. For my part, it takes something more than quantity. We have to have quality as well as quantity.

When it comes to feeding corn, I consider it the foundation feed. It is the foundation of all feed, but you must have something with it. I try to feed as much of a variety as I can. I don't confine myself to corn entirely. So far this year I have fed no bran, for it is a dear feed. I have fed oats which I mowed and cured like hay, and I find it a good feed; the cows like it. It might not have as much protein as bran and gluten meal, but it is a feed that the cows enjoy, and anything that a cow enjoys she certainly shows her appreciation of by "giving down," as we term it, the milk. I would like to hear something more from the millet people. I have some millet, and I don't like it.

Mr. Smith: I have had some experience with millet, and if it is cut early, as soon as it has its growth, before the seed forms, as soon as fully headed out—in fact, before it is fully headed—it is a very satisfactory feed. The cows relish it as well as any feed I ever fed. It gives a good color to the milk, also, and it produces a good flow. That has been my experience with it.

Mr. T. A. Shaffer: My experience is that millet is only a fair feed. It don't leave the ground in good shape and I quit raising it entirely.

Mr. G. W. Drischel: Mr. Woods, what is a fair price for milk shipped to Chicago?

Mr. Woods: I would say this to our patrons—that we have averaged 80 cents per hundred during the summer months. Last month it ran up to \$1. Sometimes before winter is over it will even run to \$1.10.

Mr. Henry Schlosser: I have the 1899 milk prices in a little book. I will read them:

January	\$0 95
February	90
March	85
April	80
May	65
June	65

July	\$0 75
August	85
September	90
October	95
November	1 15
December	1 10

This is for eight-gallon cans delivered to Chicago. I said that the average was 80 cents for the summer months, but the average for the year will run about 96 cents per hundred pounds. Last month they paid \$1 on an average.

The average is 87½ cents for the year 1899. The summer prices for 1900 were a little better. Last year, May and June, 65 cents; this year 75 cents. I think the prices for 1900 will run probably 5 cents per can higher for the year.

Mr. Woods: I will say that is the union price, the universal rate—prices never get above that. Regarding millet, I have had no experience with it, but with Hungarian I have had some experience. Fed some—commenced to feed it and the milkman objected to the milk. Said it was not sour, but that there was a flavor about it that he didn't like. I told him I had commenced to feed Hungarian and would stop and feed hay and corn fodder, and it was all right. I didn't hear anything from him after that. It seems that millet made a flavor that he didn't like.

Mr. Willing: I would like to ask whether the protein is greater in corn or in Hungarian?

Mr. Newsom: I don't know.

Mr. N. P. Banks: I would like to ask Mr. Woods if he don't think that milk can be made cheaper and better through the summer months by pasture than by feeding silage in this locality?

Mr. Woods: No, I do not. I think one good acre of corn is equal to five or eight acres of pasture. You turn cows out on pretty good pasture and in a little while it is poor. The weather gets hot and the flies bother them and they dry up. If you feed silage the cows will leave the pasture and go up to the barn and want to get in.

Mr. Banks: Your experience is that they will do better on a good feed of silage than they will on a good feed of grass?

Mr. Woods: We can make milk cheaper in the winter than we can in the summer.

Mr. Banks: Now, when the pasture is good in June and July the cows give an enormous flow of milk. Why keep them off from the pasture to increase the quantity of milk?

Mr. Woods: The trouble is with us it is too expensive; we haven't got the land. We grow so much corn that we have but little pasture. If we had a good summer silo it would pay us to fill one and have it for summer feed. It is only a question of cost. We can produce so much more feed from an acre of corn than we can from an acre of pasture that we can not afford to pasture very much.

Mr. Woods: In making silage it should not be allowed to get too dry. There should be enough liquid in the corn to preserve it. It should be preserved in its own sap. No matter how much water is used you can't get it distributed evenly, and then it is full of little spots of mold, and I don't think if it were distributed uniformly it would ever accomplish the result desired. I think the original sap is the desired article.

Mr. Willing: It is certainly preferable.

(— — —): I don't believe that if the succulence is taken out of corn anything can be put in to take its place. Apples, for instance, after they are dried never make as good pies as if they were canned with the natural juices.

Answer: Dried apples make pretty good pies sometimes in boarding-houses.

Question: Why do people who live so close to creameries in this county persist in shipping milk?

Mr. Woods: I don't know.

Question: I would like to hear your experience with the soy bean.

Mr. Welborn: I raised two acres this year.

Question: How did you handle them?

Mr. Welborn: I pulled them up and hauled them into the barn. I intended to make hay of them. We had a very dry, hot wind, and could not attend to them just then. The leaves dried up in two or three days and dropped off. Then we turned the hogs in to eat them up. The soy bean is considered, mixed with corn one-third or one-fourth, a good ration. We haul too much feed to our farms, which we can avoid to a great extent. Bran is worth \$14 a ton and the gluten meal is worth \$20 a ton, and we have to haul it several miles. It is quite expensive when you hire a man and pay him \$3 a load for hauling it to the barn. If we can raise corn, which we can do, that with something else on the farm to feed along with it makes a good ration. Then I think we can get something out of the dairy business. But then, as it is now, it takes pretty close figuring to get any dividend after the expenses are paid.

(—————): It makes a great deal of feed but it takes a man with a great deal of patience to harvest it and get it in shape so that the cows can eat it. The soy bean is hard to cut with a mowing machine. They have a machine that harvests two rows at a time—just passes along under the surface of the ground. The cow pea laps around the machinery so that it is hard to mow and hard to rake and hard to handle with a fork. There are other fodder plants, but I am of the opinion that our common field corn is the cheapest feed raised for cows; but then they need a little bran or something else to supplement it.

(—————): Two years ago I fed fresh corn to my cows. They looked nice. It is the pride of the dairyman to have his cows look well. But I lost too many cows with milk fever because of their being too fat. So I concluded to feed less corn and save the cows.

Question: What is the yield of the soy bean?

Mr. Welborn: We didn't thrash ours. They yield from ten to fifteen bushels per acre, and are worth two dollars and fifty cents per bushel.

Mr. Willing: There is another question now that the dairymen have to meet that they didn't used to. The millers have got so sharp that they hull out all the flour and we don't get much bran. Then they have got other machinery through which they run the sweepings and grind it into the bran, so that it is not as good as it ought to be.

President: Mr. Schlosser, have you anything to offer in connection with the cream trade along the line of feed?

Mr. Schlosser: I am sorry to say that I am not posted on that line. We are simply handling the product after it is made, and I do not know that I could give you any light on that subject.

President: What are your patrons over in Laporte County feeding?

Mr. Schlosser: A good many of them feed marsh hay, I am sorry to say. They feed as the ordinary farmer does corn and oats and corn fodder, which is the ordinary feed that most farmers have.

One thing I want to mention, and that is the milk market. I have been making a study of the Chicago milk market for the last year or two, and I find the milk shipping business is not a very satisfactory business in the city of Chicago. It may be on a better basis now than it was several years ago, but it is not on a very satisfactory basis yet. I believe the time is coming when the milk business in Chicago will be changed considerably; when milk will be sold for the city trade on its merits; the quality will be taken into consideration the same as when it is sold to the creameries. I think, when that time comes, the milk business in Chicago will be on a better basis. I believe it will be done in that way in course of time. Three per cent. milk is not worth as much as twelve per cent. milk.

Mr. Woods: Regarding the bean business, can't they be planted with the corn and have part beans and part corn for cow feed?

Mr. Schlosser: Not very well; the corn shades the beans. You would not have half a crop of corn nor half a crop of beans, and you would spoil both.

Mr. Welborn: Down in the southern part of the State at the Greene County Farmers' Institute last year a man said something about the cow pea, and urged us to plant corn one way and then drill two rows of peas between the corn rows. I tried that some two years ago. I had my corn tolerably thick for silage and around the edges I got a right smart lot of feed. Right from the edge the peas came up and grew pretty well, but fell over a little. One year I took the "Kentucky Wonder" and planted them in the corn rows. They came up and grew, but the vines were very slim and tender. If we plant the corn thick we never get a good crop of corn and we can't get a crop of peas. If we should plant corn thin like they do down in North Carolina you might raise peas. If you can plant corn so as to raise twenty tons to the acre, which you can do, and get grain, don't plant it so as to get only ten tons and run chances of getting a crop of peas. If you are going to raise corn, raise corn; if you are going to raise peas, raise peas.

Mr. Holloway: Did you ever raise peas with oats?

Mr. Newsom: I never tried it.

(———): Suppose you plant the cow pea the first of June or the last of May?

Answer: They are up quick and for the first two weeks are away ahead of the corn, and if they are planted together they will take care of themselves.

Mr. Newsom: We have had a little experience with the beans in the corn. We prefer to raise the corn by itself and the same with the beans. If we want to put them in the silo together we cut a load of one and then a load of the other; haul them alternately.

Mr. Van Norman: We put some in last year at Purdue and they made very nice feed. The herdsman liked the silage very much and the cattle ate it well. We put in some more this year. That was the cow peas. This year we planted quite a plat of cow peas—had some of both cow peas and soy beans. We did not have the trouble in harvesting them that Mr. Welborn spoke of. We mowed them with the mower, both varieties, and the vines we raked up with the pitchfork and cocked up. We were going to make hay of them, but we had a week of wet weather when we wanted to cure them, and so we had trouble and were unsuccessful. We fed some of the vines to the sheep and they ate the leaves and the tops

but not the stems. We had a number of varieties grown experimentally at Purdue. Three times during the season we sent a man through to separate the vines on the edge of the plats. Some of the vines were five or six feet long.

Mr. Woods: What variety do you like the best?

Mr. Van Norman: With us the medium green, the yellow and the brown soy beans have done the best. For grain the whip-poor-will, the red ripper and black-eye cow pea have yielded best, while for green manuring the wonderful and the black cow pea have made good growth.

(—————): Can you give the amount of feed to the acre in tons?

Mr. Van Norman: Eight to ten tons of green feed.

Mr. Woods: I sent to the Albert Dickinson Company, of Chicago, this spring and got some cow peas—got a big black pea. They were sowed a little early in the spring and it was cold and they didn't start well, and I only got a few ripe peas from them.

Mr. President: Has any one any other question along the line of milk shipping, dairy feeding, butter making and creamery supplies?

Mr. Van Norman: The cow pea should be planted from May 12 to June 25.

Mr. Shaffer: About the raising of products on the farm to feed stock, I would like to hear the experience of some regarding the feeding of corn and bran, and the feeding of corn and oats, which you can raise on the farm. Which is the cheaper?

Mr. Newsom: We don't like to raise oats. We raise corn and some wheat and some rye. We aim to sow clover with the wheat, and then we have the bran to feed our cows.

Mr. Shaffer: And you feel you make it pay?

Mr. Newsom: Yes, sir.

Mr. Van Norman: Why don't you like to grow oats?

Mr. Newsom: Because our land is poor.

Mr. Shaffer: I have raised corn and oats and like them. I generally have the corn and oats ground.

Mr. Willing: I think unless the land is too poor that it is better to raise all the cow feed on the farm and not buy a portion of it, and in that way we can make it pay.

President: We will ask Mr. Stahlman to express his views on this subject.

Mr. Stahlman: I never fed a cow in my life.

President: You are interested in the creamery business, I believe.

Mr. Stahlman: Yes. As a rule our people are not heavy feeders, outside of one or two perhaps. I am not prepared to say whether they buy bran or figure on feeding only what they raise.

Mr. Fred Creter: In speaking about feeding, not being money in it, I have made it pay by feeding corn and oats and hay. I bought a farm and paid for it, and that is pretty good evidence.

President: Mr. Schlosser, what is the general opinion in your locality?

Mr. Schlosser: We do not buy much bran there. Of course I do not interest myself enough in the cow business to make a study of these points. My brother says that when bran goes above \$12 he can not buy it. It depends entirely upon the price. At twelve dollars or less it is profitable to buy.

Mr. Smith: I don't know that I can say anything of any particular value from my own experience. In feeding, whenever bran is a reasonable price (that is, from \$12 or \$13) I usually buy considerable bran and feed it with the corn and corn meal. But at present bran is high and I can not get bran short of \$15 or \$16 a ton, and it strikes me that, at the present price of oats, the oats ground with the corn are the cheaper feed.

President: The Committee on Reception is not on the program, so I will take the liberty to appoint them. I will appoint Mr. Woods, Mr. Banks and Mr. Richmond.

The convention then adjourned at 12 o'clock noon, Wednesday, December 5, 1900.

AFTERNOON SESSION.

The afternoon session was opened with music—vocal solo.

J. M. Knox: I move that the different committees be appointed.

Motion seconded and carried, and the following committees were appointed:

Auditing Committee—G. W. Drischel, Sam Schlosser and J. M. Knox.

Committee on Resolutions—Professor Plumb, A. J. Newsom, N. P. Banks, Silas Holloway and J. V. Shugart.

The Treasurer made his report, which, on motion, was referred to the Auditing Committee. (Treasurer's report in back of this report, page 75.)

Mr. Holloway: I would like to hear some experienced man express himself on the value of sweet and sour milk for hogs. I want to tell my patrons about it. I don't have any hogs to feed myself.

Mr. Shaffer: I prefer sweet milk, because the sour milk will give the pigs the scours, especially if they get a little too much.

Question: What aged pigs?

Mr. Shaffer: I don't see very much difference between pigs and hogs. If pigs get too much sour milk it stunts them and they never do as well after that. Talking about having pigs drink sweet milk at five or six weeks old, I believe I can get them to drink milk before they are four or five weeks old.

Mr. Small: I just came in and didn't hear the paper at all; didn't hear anything about it. So far as the different feeding values of sweet and sour milk go for feeding pigs and young shoats, I agree with the gentleman; I believe that milk is worth twice as much sweet as it is sour. After it gets sour there is an acid in it that don't agree with the taste of young pigs as well as the sweet milk; don't agree with their digestion. It would do very well mixed with shorts, but sweet milk just as it comes from the creamery will not hurt them. After the digestion of little pigs gets impaired that stops their growth, stunts them, and after they are stunted it takes more feed to get them into good shape again.

Mr. Holloway: What about feeding sour milk to big hogs and shoats?

Mr. Small: It is always better to feed sweet milk; sour milk is not so dangerous with large hogs as with small pigs. We generally feed all our milk to our pigs. We don't get enough to feed to the large hogs.

Mr. Holloway: I have one patron who takes sour milk in preference to sweet. He thinks it makes the hogs grow faster. He takes it for large hogs and shoats.

Mr. Drischel: May I ask how sour you have the milk? Just have it sour or so the whey and the casein part, or have it thick? For instance, the buttermilk that comes from the churn to-day he takes to-morrow. Would not your pigs prefer the buttermilk that comes right from the churn?

Mr. Holloway: I don't know. This man thinks he is a very successful man in feeding. He always takes sour milk in preference to the sweet.

For young pigs he takes sweet milk, but for shoats and big pigs he prefers sour. I just wanted to hear some expression on the subject. As far as I know I prefer the sweet milk. I know one thing sure, the digestible part of the sweet milk is better than the sour milk, for there is not so much acid in it. The easier the food is digested the more gain the pigs make. The more food you can make them take and digest in a certain length of time the more profit. We don't aim to keep pigs over six or seven months. The more weight we can get on them in that time the more profit. Hogs kept after that time take too much to keep them alive. Take one hundred pounds of corn meal and one hundred pounds of milk, and it will make more meat on a small hog than it will on a big hog that weighs three hundred pounds.

Music by the mandolin club of Hobart.

Mr. Willing: It strikes me that the combination of pigs and clover ought to be talked about. It is a good point. I remember at Crown Point Mr. Mahan was the principal speaker on the pig question. I think he had his whole farm fenced so as to pasture clover, and raised clover exclusively. I will bring up the question here whether to ring hogs or not. I have heard veterinarians discuss the point, and they claim that certain portions of the pasture should be left plowed up. The dirt they get into the system would cure any indigestion.

President: Can any one answer that question?

Mr. Austin: A healthy hog will not root.

Mr. Holloway: It won't if it don't rain.

Mr. Drischel: I wish to say, being in the cheese business, I can give you my experience on sweet and sour whey. We buy sixty to eighty-pound pigs semiannually and turn off that many each year. For sixty and eighty-pound pigs it makes good feed. But in the summer season the whey is sour; then look out. You will then have to feed according to the state of the whey at that time in order to have good results.

Mr. Willing: What are the constituents of whey? What is the value of it?

Mr. Drischel: Sometimes a good deal of butter goes off in the whey, and it will be sweet from now on to the first of April.

Mr. Willing: What is the value of it as a food per hundred pounds?

Mr. Drischel: I don't know.

Mr. Woods: The paper stated that he recommended giving skim milk and shorts to pigs. Wouldn't skim milk and corn meal make a better

ration for the pigs than skim milk and shorts? There is too much sameness—too much protein.

Mr. Small: I think Mr. Woods is about right. You want to give them some corn meal and skim milk. Corn meal alone is not as good as skim milk, shorts and a little corn meal. If you want to grow a frame and muscle you want to give them just as much as they can digest. The more frame you get when the pig is young the bigger and thriftier the hog will be and more easily fattened. If you feed too much corn meal you don't get enough growth in the bones to make a big hog. You will always get a bigger hog by feeding shorts with the corn meal and skim milk than by feeding the corn meal and skim milk alone. That has been my experience.

A GREAT LONDON DAIRY.

PROF. C. S. PLUMB, LAFAYETTE.

The people of our towns and cities are at the present day showing a great interest in the subject of milk and the source of supply. People are no longer indifferent as to the character of the milk sold them, and so State and city laws have been enacted to protect the consumer and the honest producer. Medical and health journals and the public press discuss milk and sanitation, so that all thoughtful persons feel the necessity of using only healthy milk in the family, and more particularly with young children.

Consequently something about the milk supply of a great city like London, with its 4,000,000 inhabitants, may be of more than passing interest.

London has many milk companies of varying degrees of importance, some of which do an enormous business. The milk sold comes from over a wide territory in England. For example, milk is shipped from one locality in south England, 163 miles distant.

This milk is very largely produced from milking Shorthorns, the standard dairy cows of England.

In order to see something of the source of the milk supply, I visited one dairy 70 miles from London, where 500 cows are kept, that of Mr. George Adams, of Faringdon. This gentleman farms 4,300 acres, part of which he rents, and his land is divided up into several farms located in different parts of the town. These cows are consequently in several different herds, and subject to the care of different men. In the summer they are given very superior pasture, and are fed grain according to circumstances. He told me that in 1899 he bought about 100 tons of Indian

corn meal, and when he wanted milk most, he fed three pounds of this, three pounds of decorticated cotton seed cake and two pounds of common cotton cake. With this plenty of hay was fed.

In the summer he practices soiling besides pasturing, and feeds alfalfa, which he likes very much.

Mr. Adams breeds all his own cows, which are really pure bred unregistered Shorthorns. He breeds them to have the first calf at two and one-half years old. All the heifer calves are retained, but all the bull calves are sold. If a cow is a good milker she is kept five or six years, after which she is got with calf and sold to go to London. If the cow does not breed, then she is beefed. Each cow's milk is tested in a glass tube, for per cent. of cream, but the milk is never weighed, and no accurate record is kept of the annual milk yield of each cow.

The cow is milked with about the same care that is common in the better class of dairies in America. On one of Mr. Adams' farms a very excellent arrangement is provided in the dairy for running the milk through a wire and cloth strainer over a cooler into the shipping cans, the milk thus being reduced to about 60 degrees temperature, which in America we would call hardly cool enough. The cows are milked at 4:30 a. m. and 3:30 p. m., and the milk is shipped at 5:45 p. m. and 6:45 a. m. to London. At the time of my visit Mr. Adams was shipping 50 cans of milk a day to London, each containing 17 imperial gallons of 10 pounds each, or a total of 8,500 pounds, which is equal to 17 pounds of milk per cow, with 500 cows as a basis.

In order to see a London dairy we must follow this milk to London. It goes on a special milk train made up of freight cars that appear small to Americans. The large size I am told will contain about 67 shipping cans and the small cars about 42 cans. These cans, which are characteristic of England, are widest at the base, and taper gradually toward the top, where they flare out some in the form of a rimmed collar. They have two metal handles on the sides about half way down, and the top of the can usually has a brass label on which is the address of the shipper, while another label also has the address of the party to whom the milk is shipped. Each can has a number stenciled on the lid and the same number on the can. The interior of the can contains at regular intervals metal projections, each of which indicates a given amount of milk in the can, and serves for measuring milk off in the cans. The top of each can is also provided with a ventilator.

At certain railway stations in London immense quantities of milk are received each day. Trains pull into the station, where they are met by representatives of the dairy companies. Each man representing a firm secures his consignment, examines the milk and measures it off in the cans in various amounts, and sends it out on the company's vans that are backed up and waiting at the station, from which place it is distributed to various retail dairy stores and depots in the city.

At Paddington Station, where I watched them handling milk, a railway employe told me they received about 3,000 cans a day, or about 500,000 pounds. And this is only one of the numerous railway stations in London where milk is received daily from various parts of England.

This milk being received must be distributed, and so I wish to call your attention to the methods of one of the great distributing milk agencies of London—The Express Dairy Supply Company. So far as I am aware we have nothing quite like it in America, and as I saw features in the management that interested me, perhaps it may also interest you, and especially those engaged in selling milk. This is what is known as a "limited liability" stock company, capitalized at \$100,000.

This company has a head office for transacting clerical business, which is in charge of a general manager, and 45 branches, of which 17 are dairy supply stores and the balance dairy restaurants. These are scattered widely over London and the suburbs. The restaurants supply light refreshments, with milk and its products as leading features of the bill-of-fare. The dairies, of course, sell milk, cream, skim and butter milk, and butter, and they also sell bottled milk of several sorts, clotted cream, or Devonshire cheese, eggs and bread. They have their own bakeries and make their own bread. The eggs are largely purchased, and the company also buys large quantities of butter, which is prepared for their customers. They sell butter of two grades, one being known as creamery or fresh butter, containing no salt, while the other is known as Brittany, or salt butter. The latter is brought from Brittany in France and worked over, and is the cheaper of the two sorts. The creamery butter sells at from 26 to 36 cents a pound, while the Brittany sells at from 24 to 30 cents. This company supplies 14 pounds daily of specially prepared butter to the Baroness Burdett-Couts, one of the famous women of England, for which they receive 36 cents per pound the year round.

It was my privilege to visit and inspect the workings of one of the larger branches of this company in the suburbs of London. Here I found a substantial brick structure, with a glass covered court yard. This building contains offices, salesrooms, waiting room, churning, milk-receiving and washrooms, and stable and accessories.

A heavy two-horse van of this company hauls loads of milk to the dairy, where it is run through a strainer of four thicknesses of cloth into big delivery cans, which are sealed with wire and lead seals. These cans are put into one-horse retail wagons, or into push carts in the charge of men or boys. After being placed in the cans all the milk must be drawn off from below by means of a faucet. At this branch of the company fifty men are employed, of whom seven drive wagons and six have push carts. A delivery clerk issues to each man the quantity of milk he applies for, and each man is required to give a sample of the milk from his can to the clerk, and this is tested for its temperature and specific gravity at the time of delivery, and these figures recorded on the books with the

name of the milk shipper and the amount. This is simply a method of the company to attempt to keep a record of the quality of their milk as taken out by delivery agents.

The delivery man begins at 4:45 a. m., and works till 6:30 or 7:00 p. m., taking out one and a half to two hours for breakfast and ten minutes or so for dinner. Men who drive wagons get 22 shillings (about \$5.50) a week and a commission on new customers of two shillings per quart. They also receive a commission on securing customers for butter, eggs and "humanized" milk, the commission varying with the order. The amount of milk delivered by one man depends on circumstances. One man delivers 400 quarts daily, which they claim is equal to the biggest run in London, representing about 150 separate customers. Milk is either measured out at the door, or little tin buckets holding about a quart are carried out with the wagons and are left at the houses and empty buckets taken away. One may see the push carts going about with many small buckets fastened to them. Each man who delivers must wash his own cans, or see that some one does, in which case he must pay for the service.

This company sells considerable bottled milk of different kinds, including buttermilk, koumis, and what they term "humanized," sterilized, peptonized and pasteurized milks. The humanized is made to resemble human milk as much as possible in character, and sells for 6 pence (12 cents) for not quite a pint. Sterilized milk is simply that which has been heated to a point sufficient to kill all life therein, and it sells at 2½ pence (5 cents) a pint, and customers are charged 2 pence (4 cents) for the bottles, which are credited to them on their return. The pasteurized milk is heated up to 130 degrees, which is not high enough, and is then chilled down to as cool as can be over a Star cooler, through which runs hydrant water. This is not bottled, but is put into cans. The customers do not recognize it as pasteurized, but the company does, and they think it keeps better than when not so treated. Peptonized milk is ordinary milk to which pepsin is added. A given amount of pepsin in a tube is added to three pints of milk. This milk is bottled and sold to invalids, yet but little is sold, although some doctors recommend it strongly. There is also but a slight demand for koumis. A certain class of milk is also known as "nursery milk," which is simply a selection from the best tested milk received each day from the country. All surplus milk that is not too sour is run through a separator and the cream, after very slightly ripening, is churned in an upright churn after the form of our dash churn, in which revolve wooden paddles about the sides. No ice is used, and the butter is softer and more mushy in appearance than the best American product. The butter is delivered to customers by men driving the milk wagons.

This company has two outside foremen at this branch, who go on the rounds from time to time and see that the delivery men are serving the customers all right. If a delivery man is sick one of the foremen can take his place, or can teach a new man the route.

The company has a farm known as "College Farm," at Finchley, about two and one-half miles from the branch dairy that I visited. This consists of about 120 acres, including the rented land, only ten of which are arable, the rest being in meadow. The arable land is mainly used on which to grow roots and rye, and they grow all the roots fed, and buy practically all their grain. They milk about forty cows, composed of Shorthorns, Kerries and Jerseys. They feed oats, bran, oil cake, cotton cake, wet brewers' grains and pea meal. Brewers' grains are fed twice a day, about half a bushel at a feed per cow, and they also feed other grain with these. They plan to feed about one pound of other grain than brewers' to every two quarts of milk. Dry cows get no grain. Newly calved cows for the first three months are milked three times daily. They estimate that they feed about five pounds of hay per day until the cows go on grass in the spring. The cattle were watered in the stalls. A record of the daily yield of each cow is kept, in quarts. Remarkable bedding is being used on this farm in the form of hops, which cost £2 a ton, or \$10. They had used this for two years, as it was cheaper than any other bedding.

The Express Dairy Company is a big concern. The general manager could not tell me how many customers they delivered milk to, but said it was thousands. They advertise extensively and hunt for customers.

In the general trade they use a paper sack, on which is printed the name of the company, a list of the dairy farms (2), dairies (18), butter factories (2) and refreshment depots (23). At the top is the British coat of arms placed there "By Royal Warrant" "To Her Majesty, the Queen."

I was given a handsome portfolio, tied with ribbon, containing "Pictures of Celebrated Cattle" belonging to the company and kept on one of their two farms. They also distribute a handsome souvenir album of fourteen pictures of views on the College Farm. Another interesting advertisement is of a colored folder, which when opened brings a table in position, about which is a nurse and children eating food from the Express Dairy Company.

Canvassers of the company solicit trade from people wherever possible. Cards are used on which is kept a record of any facts of importance relative to a new family moving into the district supplied by this firm. If a vacant house is rented a person representing the company finds out who the newcomer is, gets his address, solicits his patronage and makes a card record of name, address, when he is to move, whether he will trade with them, etc., and the name of the canvasser or reporter is affixed to the card for future reference. This method seemed to me a very commendable one and worthy of adoption by progressive dairymen in America.

This dairy company probably represents as high class a one as delivers milk in London. They have in many respects a superior equipment.

and make a very creditable appearance in many ways. They probably represent what is equivalent to our better class of dairy dealers in America, but not our best.

DISCUSSION.

Mr. Schlosser: I would like to ask how their Shorthorn dairy cattle compare with our dairy breeds in the quantity and quality of milk they give.

Professor Plumb: You mean our dairy Shorthorns? We wouldn't compare them to the Jersey and Holstein. The great difference between the dairy Shorthorn in this country lies here: The breeders in this country have mixed the beef and dairy types of Shorthorn, consequently, in this country we haven't herds for milk purposes. Some of them have good-sized udders and make very fair dairy animals. Now, in England, you find more general uniformity in type. They are leaner and have udders altogether larger than ours. I know in 1893, at Chicago, the collection of Shorthorn cows at the dairy exhibition were supposed to represent a special collection of the better dairy Shorthorns found in this country, to compete against Jerseys, Guernseys and Holsteins. Professor James Long, who is one of the dairy authorities of Great Britain, came over to this country at that time and visited those Shorthorns in the barns at Chicago. He went back home and wrote in the papers of England that the cattle we had in this country on exhibition were not good representatives of the dairy Shorthorn. I believe he told the truth.

Mr. Woods: What is the advantage in the cover of the cans being slightly concave? I find some very much concave on the top. Is there any advantage in that for cleaning? I should say the most advantageous cover would be one that could be cleaned very readily. Our covers here are a great deal convex.

Professor Plumb: These covers are slightly curved over the top and have a ventilator for letting air in.

Mr. Smith: Professor, I understand you to say that cans there were shipped partly full.

Professor Plumb: Yes. If a man had a certain number of cans and the cows didn't give enough to fill each full, he shipped them, even if one or several were partly full.

Mr. Smith: If we ship cans here partially full there would be considerable butter in them when they got to their destination. The action in transportation would churn the cream.

(———: I would like to ask a question about the color of those Durham cattle. Are they just like ours? Isn't it a fact that the roan make a better dairy cattle than the red? Or do you think the color makes any difference?

Professor Plumb: No, I don't think it does. I think in the stockyards in some places the roan is preferred by the butcher, but I have never heard that mentioned in connection with the dairy quality. You know down in Kentucky they, as a rule, prefer reds.

Mr. Woods: Who does the milking over there?

Professor Plumb: Both women and men.

Mr. Willson: Is the cost of producing not more expensive over there than in this country, with our forty and fifty-dollar-an-acre land? And how does the price which we receive for it compare with the price they get?

Professor Plumb: Mr. George Adams bought and rented several thousand acres of land. He paid as low as \$2.50 an acre for grain land, and paid as high as \$7.50 an acre for pasture land, and the price for milk I believe ranged somewhere in the neighborhood of 25 cents per gallon.

Mr. Willson: To the farmer?

Professor Plumb: No, not to the farmer. I can not tell you how much the farmer got out of it. I can't answer that; but I know this, and that is that the farmer ships his milk into London and they pay him a specified price very much on the same basis as in this country. You find people paying higher prices for land than we do over here, and very high rents, and living in a style as good as the best of us—people with no more education than the average in this audience. If you go through their homes it is most interesting to see how they live, and note a personal pride they take in their homes that is very often unusual in the United States of America. Those people over there have helpers to milk, their homes are exceedingly comfortable, contain substantial furniture, and everything is clean. I can not understand how they pay such high rents. The land is owned by a few. I can not understand how people pay the rents they do and live as they do, and probably their prices for goods are higher there than they are here. A man can sell goods for more money, but it costs more to buy there. Ordinarily it costs more to buy goods in Europe than it does here. It is marvelous to see how the people live. I went into farm homes in Holland where they wore wooden shoes among the peasantry of that country, and the beauty, particularly of their homes and stables, astonished me. I went into one dairy farmer's home in Holland, which I was taken into by a Dutch-cheese

buyer. It was under the same roof as the barn. They had twenty-two cows. The house contained beautiful silverware and china, and everything was as neat as it possibly could be. There were many attractive things about the place. I hardly dare tell you about the inside of the cow stables. On the floor they had matting laid the whole length of the barn, and in one barn that I went into each stall was covered about so deep (indicating) with peat. Around each stall was laid on edge numerous blue china plates about the sides of the stall. Twenty-two of these stalls had an equal number of these plates. There might have been several hundred plates in the barn. The stalls were painted with beautiful enamel paints. In the corner they had a dining table and chairs, and the family ate in there during the summertime. In the winter they took out the dishes, matting or carpeting, tables and chairs, and then the cattle used the stalls. In another barn that we went into near by the floors of the stalls were covered with small white seashells, and looked very beautiful. I made a tour of a certain part of Holland with a Dutch cheese buyer and a cheese buyer from England, and the Englishman was dumfounded at such sights. These people keep their houses in the best of shape. They have brick sidewalks in front and nice ornamental doorways, and everything is kept up bright with paint. On entering the house they leave their shoes outside. It is most interesting to see how the lower classes and farmers in the country live in Europe. You can not have any idea of it until you go over there and see for yourself.

Mr. Shaffer: How does the variety of food compare? Do they have as much of a variety as many farmers in this country?

Professor Plumb: They are very moderate liveis. The average Englishman in the morning has mutton chops, bread and butter, and coffee. Of course, I think that one of the great secrets of success of those people lies in the fact that they are persistent. They do not try this thing a year or two and then try another, but for generations keep at the same thing in the same family. So that the man who stays by the same line of business year in and year out figures out on the better side.

Mr. Drischel: Why is it that so many English buy Holland butter in preference to American butter, Professor?

Professor Plumb: Because they have poor judgment.

Mr. Drischel: You know it is a fact?

Professor Plumb: I know they do. The little country of Denmark controls the market of England. In the first place the English people are not butter eaters. There is not a nation in Europe consisting of butter eaters. The butter there has very slight flavoring to it, and usually little

or no salt—salt is very rare—and consequently it seems to lack the live character of a superior American butter. I am certainly glad to come back to American creamery and our first-class butter.

There is another matter that I want to bring up in regard to the next meeting of the Dairy Association. I wish to invite the State Dairy Association to meet at Lafayette for the next annual meeting. Purdue University will provide the necessary accommodations, with no expense to the Dairy Association, and will endeavor to make it a profitable meeting. Tippecanoe is not as prominent a dairy county as Lake, but we think there are enough attractions there to make it worth while for the Association to accept this invitation.

The President then appointed the following committee to solicit memberships: Mr. S. P. Woods, Mr. N. P. Banks and Mr. H. H. Willing.

[List of butter entries and scores will be found after Treasurer's report in back of book, page 77.—Editor.]

Mr. T. F. Gallagher: I would like to say a few words in regard to the convention to be held in St. Paul, Minn., in February. It seems that at the exhibition of the National Association they reduced the number of entries to ten to take part in the contest for the banner. That gives the State of Indiana a fine opportunity of securing the banner. Last year the number of entries was twenty; this year they reduced it to ten. And if this State will have ten packages at that convention that will score as high as these eleven average—somewhere around 93 or 94 points—they will carry off the banner, sure. I hope the members of the association will make a special effort to get as many entries as possible. It will advertise the butter manufactured in this State all over the country.

WHAT CAN CREAMERIES DO TO IMPROVE THE SOURCE OF MILK SUPPLY?

SAMUEL SCHLOSSER, HANNA.

In looking over the program I notice no other subject on creamery work.

Why our Program Committee gave but one place to creamery men I am unable to say.

That Indiana has made no particular record in the creamery business is well known. The only renown ever achieved along this line is in the number of defunct creameries scattered over the State. Her record for

"busted" creameries can't be beat! I doubt if the State produces as much creamery butter as it consumes. The number of really successful creameries is very small. There are a few, however, that are notable examples of the possibilities for properly managed creameries.

A person unacquainted with the business, yet familiar with our agricultural resources, naturally asks, "Why this state of affairs? What is the cause of the numerous failures? Why not more successful creameries?"

The reply generally given is that their milk supply was not large enough to make it pay. Very true, but is this the only reason for the many failures?

Of course, no creamery can be prosperous without a generous supply of good milk or cream, but why this lack of raw material?

Cows, with proper care, thrive as well in Indiana as elsewhere. A larger variety of milk-producing feeds is nowhere possible. We have fine pastures. The soil produces corn, oats, clover, timothy, cow peas, sorghum, mangle-wurtzel, sugar beets, and wheat, which gives us bran and shorts.

Better dairy feeds are not to be found. We dare not make the plea that natural advantages are against us. They are not! If soil conditions were a controlling factor, Indiana should be one of the leading dairy States.

Where, then, is the trouble? I am afraid it is too near to be seen. We creamerymen, dairymen and farmers all are at fault. Incompetency in the management of the creamery and lack of dairy knowledge on the farm have closed many an Indiana creamery. The blame for failure rests alike upon creameryman and farmer.

The only true remedy for existing conditions is a wider and more general dissemination of real dairy knowledge.

How often do we see a man selected to manage a creamery who knows nothing whatever of the most vital questions connected therewith. We can not expect a larger or purer milk supply for our creameries until we have better creamerymen and a class of patrons who are willing to become dairymen. Besides possessing a thorough knowledge of all that pertains to the would-be source of milk supply the creameryman must be a model of cleanliness, neatness and promptness. He can not expect to favorably influence his patrons unless he does his work as it should be done. All machinery should be kept in first-class condition, the factory scrupulously clean, and everything about the premises in order.

When the milk arrives it should be cared for at once. Nothing discourages patrons so much as to be compelled to wait a long time on the butter-maker to do something that might just as well have been done the afternoon before. The personal appearance of the men who do the work should not be overlooked.

These are silent influences that often do more good than much talking.

If the patrons see that the creameryman is really interested in his work and is doing his utmost to make a success of his business, they will likewise become interested and an increased milk supply is almost certain. To secure the confidence of the milk-producer is absolutely necessary, especially when milk is bought by the test. No creamery can exist unless it has the entire confidence of its patrons. Consequently, all business must be done honestly and uprightly.

The test will generally cause more or less trouble, but by no means should the creameryman deviate one particle from what he knows is right.

He should never cut down the high tests and add to the low ones. It is impossible to get farmers to believe in the justice of the test by handling it thus. Be sure your tests are right and then pay for your milk accordingly.

A good way to satisfy a patron that his test is correct is to test his individual cows for him. This should be done on the farm with a small hand-tester. The sample should be taken immediately after each cow is milked. The testing then can be done in the presence of the patron and explained to his entire satisfaction. Creamerymen can do no work that will be more fruitful of good results than to test the individual cows of their patrons. It is a good way to get farmers interested in their herds. You will generally find a wide variation in the quality of milk from the different cows. This will lead the farmer to thinking, and that is just what is wanted. We must get farmers to think along dairy lines.

Very little improvement can be expected in the milk supply unless patrons learn to use their minds as well as their hands. The distribution of good dairy literature will often be found very helpful. It is surprising to know how small a percentage of the creamery patrons read dairy papers. I will venture to say that not one out of twenty is a subscriber to a dairy paper, and many do not even take a general farm paper. Get the patrons to read dairy and farm literature. The all-important questions of breeding and feeding should be given more attention.

If the general-purpose cow, or the no-purpose cow, could be replaced by the special-purpose dairy animal, the quantity of butter would double without the enlargement of a single herd.

If the corn fodder that is wasted annually would be used to produce milk, creamerymen might be spared the anxiety of having nothing to do during the winter months. Opportunities to improve the source of supply are unlimited.

I have mentioned but a few things that all creameries are able to do if they will. The future of the business depends largely on whether effectual educational work can be carried on among the patrons. A wider and more general dissemination of true dairy knowledge is the need of the hour.

DISCUSSION.

Mr. Holloway: I would like to ask Mr. Schlosser how he would induce his patrons to take and read dairy literature. I have tried to do it, but how to do it I don't know.

Mr. Schlosser: I guess it is one of the unsolved problems we heard of two years ago—one we are unable to solve. It is a fact that unless we can get patrons to read we can not expect any improvement. We should keep at the matter the best we can by reading and subscribing for dairy papers and try to get them interested in various ways. I think another way that creamerymen might interest the farmers is by trying to get our farmers' institutes to devote more time to dairy questions. There are often farmers that attend the farmers' institute that would not go away to a meeting like this. I sent out a notice of this meeting to all of our patrons, and I am sorry to say but very few attended. It seems to be too far for them to come to Hobart from Laporte County. A number of these patrons will attend the farmers' institute this winter, and if we can get good dairy subjects discussed at the farmers' institute we may get the farmers to thinking, and if you get one farmer thinking it is going to spread to others. He will tell his neighbors what he is hearing, reading and seeing, and he is liable to have more or less influence. We have at times had circulars distributed among our patrons on the care of milk. They have a certain influence; you can not measure the influence they will have; you can not always see the results. It is a fact that Indiana is away behind in the creamery business. Take last year at the national convention—we had only sixteen tubs of butter, while the State of Minnesota had 190. From this we get some idea of the creamery interest of Indiana and that of a State like Minnesota. I think we, as creamerymen, should take more interest in this matter.

Mr. Willson: Would you think it advisable to voluntarily subscribe and send your patrons dairy papers?

Mr. Schlosser: I think it would be, to a certain extent, at least.

Mr. Holloway: I know a number of patrons to whom if you would give some good dairy paper, they would take it and read it. If you give a paper to one you will have to give to all. But then there are many that would take it from one year's end to the other, if you would send it to them, and then hardly ever see it.

Mr. Schlosser: How many patrons have you?

Mr. Holloway: I have about ninety names on my list.

Mr. Schlosser: Well, that would cost you in the neighborhood of fifty or sixty dollars a year.

Mr. Willson: Some dairymen in the Elgin district have distributed papers. I know one man who has distributed 2,500, and another 500, and they believe that it is a paying investment.

Mr. Holloway: I have thought of that myself and have had that plan in mind, but somehow or other I didn't carry it out. There is no question but something like that should be done if we expect to build up the creamery industry in this State. We have got to have an interest in the dairy business. There is no reason why the State of Indiana can't produce just as good butter and just as cheap butter as any other State. There is no question about it, we can produce just as good butter and produce it just as cheaply. It is only a matter of doing it.

Mr. Newsom: I think it would be a good idea to begin away back. Teach the boys and girls agriculture and you will have no trouble in getting them to take farm papers. In the next generation we will have plenty of creameries and plenty of dairymen.

Mr. Drischel: I think the Dairy Association of this State would be more progressive by getting a school. At Columbus, Ohio, they have a building lately built by the State where boys and girls may be thoroughly educated on this dairy question, as well as on other farm problems.

Mr. Holloway: I think the State ought to devote more money to the dairy interest, but how to get the State to do it is the question. The State is just like the people are. We want representatives, but when we go out to get representatives the dairymen don't come out and vote. They vote for their parties. We must get right after them. If we expect our State to give a larger appropriation for our dairy work we will have to get out and dust. If every dairyman in the State of Indiana would spend 4 cents and write a letter to his Representative and Senator, write two letters, we can get the appropriation we need. Unless we do that we can't expect to succeed in this matter. We can't shift it off on some one else. I would like to hear something about the test.

Mr. Schlosser: We have been in the creamery business fifteen years, almost sixteen years. We have been buying goods by the test the entire time. We first bought cream by the old oil test and then by the Babcock test. We have never thought of buying milk in any other way—can not afford to buy in any other way. We haven't had a great deal of trouble in that line. Of course we have a little. I believe the fault of the test lies with the creamerymen; that they don't apply it right. I believe in giving a man just what the milk tests. If it tests two, give him two, and if it tests five, give it to him. Do your testing carefully and pay for your milk accordingly, and then if you find a farmer that you can not suit, go out and test his cows for him, and generally you can explain it so that any intelligent man will understand it. But then there are only a

few persons in that class. Of course, we have a few. We can't have everything our own way.

Mr. Holloway: Do you ever have patrons bring samples in to be tested?

Mr. Schlosser: Yes, I do; but I don't like to test them.

Mr. Holloway: Do you encourage farmers to bring samples?

Mr. Schlosser: No; because the farmers won't bring fair samples. The proper way to test cows is to take samples right out of the pail. He can't see why his cows don't test higher than 3, 2 and $2\frac{1}{2}$ when his neighbors' test 4 and $4\frac{1}{2}$. He thinks there is something wrong. Go out to the farm and take some of the milk and test it in his presence. Explain to him how you mix it and why you put in the acid, etc., and show him every detail of the work. After having the test done, have him feel there is a correct result along the line.

Mr. Small: Do you find the test the same when the temperature varies?

Mr. Schlosser: You know it might vary a great deal and be correct, from the fact that the higher tests are from cows which give a less quantity of milk than the lower testing cows give. When the milk is brought into the factory I take that into consideration and explain it to the farmers. Here is a cow that gives only two quarts of milk, and that tests high. But the next man that comes brings two gallons, and that tests low. The two quarts test 5 and the two gallons test only 3. The best way to get the farmer interested in the cow is to go out and test the cows for him. One great difficulty lies in not knowing what the cows do.

Mr. Holloway: Would it not be more correct to test the milk at the farm?

Mr. Schlosser: It would be, probably; but while I am testing his cows I want to teach him all I can. One object is to show him the difference between the cows. Of course, one thing that has hurt the creamery business to a certain extent is that 4-per-cent. idea over the country. The creameries base their price on 4 per cent. as a standard, and then vary the price with the test. The patron thinks if milk tests 4 per cent. it is all right—there is nothing wrong with his milk—but if it only goes $3\frac{1}{2}$, there is something wrong.

Mr. Drischel: I find the question with the 5 per cent. man and the $3\frac{1}{2}$ per cent. patron is one of intelligence and industry. The 5 per cent. patron figures on the basis of care and attention to his stock and produces good stock and takes pride in them. He knows what the result will be,

while the $3\frac{1}{2}$ per cent. man is slovenly in his ways and is always finding fault. That is invariably the rule in the cheese business.

Mr. Woods: I think there is considerable truth in that; of course the man who does not take an interest in his work can not get good fat.

Mr. Small: How would it be with the man with a right nice herd of Holsteins in first-class shape that test only 3 per cent.?

Mr. Drischel: They are exceptions.

Mr. Woods: Would he be placed among the slovenly kind of fellows?

Mr. Drischel: Not necessarily that.

Mr. Small: Did I not understand the gentleman to say in his argument that invariably that man who brought the 3 per cent. milk was a slovenly man?

Mr. Drischel: Any man that brings 3 per cent. milk into the creamery is sluggish.

Mr. Small: Is there not just as much profit in 3 per cent. milk as there is in 5?

Mr. Drischel: No, sir; there is not. In the Wisconsin report of 1899 you can see the difference between 3 and 5 per cent. milk. If I remember rightly, the 3 per cent. gives five pounds of cheese to the hundred pounds of milk and the 5 per cent. gives eight pounds.

Mr. Small: I say, couldn't there be just as much profit in the animal giving 3 per cent. as in the one giving 5 per cent.?

Mr. Drischel: No, sir; the 5 per cent. cow will lead the 3 per cent. cow.

I am not speaking of the Holstein. I recognize the fact that the Holstein milk runs from $3\frac{1}{2}$ to 4 per cent. per hundred. I am not speaking about the Holstein man being a slovenly man.

Mr. Van Norman: In a general way I think Mr. Drischel is right, but I believe it is possible for a 3 per cent. cow to make as much money as the 5 per cent. cow.

Mr. Schlosser: I have just one thing more to say about the quality of milk. I think there is a wrong impression, possibly, among a good many of the farmers about this matter. When we are breeding a lot of cattle and going into the dairy business, we must take into consideration what we are going to do. The farmers in this section of the State are interested in shipping milk to Chicago; that is their business. The Chicago standard of milk is 3 per cent., and if it tests 3 per cent. it will pass inspection and

will be accepted without question. I don't blame the breeders of Holstein cows for selling 3 per cent. milk. They can not produce 5 per cent. milk and sell it at the same price that the 3 per cent. milkmen can. Another class of farmers is producing milk to sell to the creamery and the creamery pays for the quality. That man's aim is to get cows that will produce the greatest amount of butter fat, and not to measure the cow by the amount of milk she gives, but by the amount of butter fat she gives.

Mr. Small: Would not the cow that gives forty pounds of 3 per cent. milk be a more profitable cow to the farmer than the cow that gives twenty pounds of 6 per cent. milk?

Mr. Drischel: It depends upon the way you are going to sell the milk.

Mr. Schlosser: I suppose the Jersey has its place and the Holstein has its place. I believe that a man should breed the cattle that he takes a fancy to. Some men get better results from the Jersey than from the Holstein, simply because he likes the breed.

The President then appointed the following committees:

Committee on Nominations—S. B. Woods, T. A. Shaffer and J. M. T. Welborn.

Committee on Legislation—Professor Plumb, Sam'l Schlosser and J. W. Billingsley.

Mr. Drischel: I move that a committee be appointed to send a telegram to our Representatives and Senators in Congress that the Grout Bill, which is to be presented in the House of Congress to-morrow, be sustained in every detail, and that the telegram be indorsed by the Indiana State Dairy Association and signed by the President and Secretary.

Mr. Van Norman: I would like to ask Mr. Drischel how many telegrams he had in mind?

Mr. Drischel: One for the Senators and one for the Representatives.

Mr. Schlosser: I understand Mr. Crumpacker is in favor of the bill. Could we not telegraph him the expression of this convention, that the entire delegation of Indiana support the Grout Bill? He could make it known to the balance of the members of the Indiana delegation.

President: Are there any suggestions?

Mr. Holloway: I would like to remark that there is less danger of its not passing in the House of Representatives than in the Senate. Would it not be better to send a special telegram to the Senators, as there are only two of them from this State?

The motion was then put and carried.

It was then moved and seconded that the Secretary and D. W. Wilson act as a committee to draft the telegram.

Carried.

The convention then adjourned, 4 o'clock p. m., Wednesday, December 5, 1900.

EVENING SESSION.

7:30 p. m., December 5, 1900.

ADDRESS OF WELCOME.

JOSEPH H. CONROY, HOBART.

Members of the State Dairy Association and Fellow-Citizens:

To me has been assigned the pleasant task of extending fraternal greetings and a glad welcome to the officers, members and guests of the Indiana State Dairy Association at its annual session assembled.

You are all welcome, thrice welcome, and by virtue of the authority vested in and delegated to me, on behalf of the citizens and officers of Hobart and Lake County, I greet you, and trust that your visit with us will be as pleasant and entertaining to you as we know it will be instructive and beneficial to us.

You are now in the center of a wide-awake farming community, rapidly taking on all of the latest evolutionary phases of a higher agricultural growth.

Your presence here, and the assignment of the 1900 meeting of the Dairy Association to Hobart, bespeaks a compliment of the most envious kind, and in consideration thereof you have freedom to investigate all our resources, and delve into the Arcana from which the draught of our progression emanates. You are at liberty to travel at will over our gravel roads, which, for perfection of system, have no peer in Indiana—the first of a series of road systems in Lake County; yes, in the Tenth Congressional District. And as you speed along this beautiful way, meeting its sister roads, which in Lake County alone in the last three years have increased from eleven miles to more than two hundred miles of graveled macadam, on either side of which are well improved farms, the fields dotted here and there with lowing herds of fine cattle, passing clean-faced and bright-eyed children wending their way to beautiful schoolhouses: meeting, as it were,

with all of the improvements of the day, I am not surprised that you should be surprised and marvel, and ask yourself the cause of all these great and recent changes wrought in the life of what we call our farming community.

Situated, as we are, only thirty-three miles from Chicago, for years it has been the custom of a goodly portion of our farmers to ship milk every morning to Chicago, having it transported in what are termed "milk trains." Thirty-eight shippers of milk, hauling from one to eight cans each, have been traveling every morning of the year from their respective homes to the railroad station in Hobart. The average haul is about two miles. During the wet seasons of the year this had become a very irksome task. By dint of the strictest economy, the balance purchase-money mortgage had been paid; they had become so expert in computation that the sides of their barns were not necessary on which to calculate the interest accrued on their respective bank deposits. Their calculations assumed a different bent. A study of soils ensued; silage was stored away; more attention was paid to the increasing increment of winter milking, with its attendant higher prices. These farmers went further. They did as I did a few days ago. They estimated the power of the milk shipping fraternity, and the results were startling, as it was a notorious fact that no special attention was and had been given to this branch of farming. As an illustration I will give you the following:

For the six months ending December 1, 1900, there was shipped from Hobart Station to Chicago 15,290 cans of milk, aggregating in gallons 123,392, which, at the average rate of 85 cents per can, would net gross \$12,964.15, or a monthly average of \$2,160.08. There are now about thirty shippers of milk, averaging to each shipper \$72.08 per month, just for one of the incidents and in a great many cases just one of the smaller sides of the farming industry.

Just think of it. From this small station, one of the smallest on the line, from only thirty small shippers of milk, nearly 250,000 gallons of milk are shipped annually from Hobart to Chicago, bringing back to Hobart \$25,000 that mostly is circulated here at home.

You know it is an infallible rule of men in the acquirement of property to become acquainted also with their rights. They had to read and study. These farmers got so far along that in addition to reading the Chicago daily papers they read the Indianapolis News and Journal and the Indiana statutes. A discovery ensued. They found that the Indiana statutes provided for a common-sense gravel road law, or what is commonly known as the "Farmers' Law," and that it provided in that law for the construction of macadam, stone and gravel roads in the respective townships wherein the county warranted the bond issue for the construction therefor; and that by its provisions all of the taxable property within such township was pledged for its payment.

A committee of citizens met, decided on a route, and drafted the petition. The proposition was submitted to the voters of the township for ratification, and upon a pledge of support to other parts of the township that their roads would be improved, the proposition carried, and the road was built. The pledges have been kept, and to-day milk shippers can get their milk to the station without "wallowing" in mud, thus saving a strain on the nervous system, saving their driving and rolling stock, and increasing their land in value from \$7 to \$10 per acre, while only increasing taxation a small per cent. Our road tax cash levy is nothing now, going to the payment of gravel road bondage and interest. This mostly is to be credited to our milk shippers and their friends. The Dairy Association has by its organization and dissemination of knowledge and experiences caused an enhancement in values in dairy products and made it possible for our farmers to better themselves and us, and for what you have actively and silently done for us we thank you, and bid you godspeed in your work; and it is our earnest wish and hope that you will still pursue a diligent research in the mysteries of your chosen work, and reach such a high degree of excellence in dairy industries, and all that pertains thereto, that the generations to come may peruse your historical developments and truly say that the virtue of man is industry.

You will observe as I proceed that evidently the year book was on my library table. Henry E. Alvord, chief of the Dairy Division of the Bureau of Animal Industries, says that "the twenty-five years following 1850 was a period of remarkable activity and progress in the dairy interest of the country." If this statement is true we must look to some cause for this activity. Before this date it was presumed that milk and milking, butter and cheese-making was the menial work of the woman on the farm; that with her old cows, shallow pans and dasher-churn she would get the dairy products for the family and incidentally make enough in trade with the village shopkeeper to supply the family with the knickknacks and winter clothing.

In 1851 Jesse Williams, of Oneida County, New York, established the first real model cheese factory. He made such an excellent product and the demand became so great that in order to supply the same he added to his own supply that of his neighbors; and under his skillful hand fine cheese was manufactured. From this small beginning in a few years sprung the immense cheese factory system, increasing the price of cheese owing to quality from 5 cents a pound in 1850 to 9 cents for prime grades at the present time; increasing the number of cheese factories to over 1,000, and putting into use 1,000,000 cows, and in 1899 producing a total product of 300,000,000 pounds at a total value of \$27,000,000.

The next feature noted is in butter making. It was found that making butter from milk and cream collected from numerous farms was a great step forward. The first creamery established was by Alanson Slaughter, in Orange County, New York, in the year 1861. This system has increased

In such manifold proportions that in 1899 the milk from 11,000,000 cows was used for butter making, aggregating an annual product of 1,430,000,000 pounds, worth and netting the enormous sum of \$257,400,000. As far back as 1846 Mr. Gall Borden, of New York, experimented upon the making of condensed milk to be preserved for long periods and ready for use in any climate. At last his plan was perfected, and to-day dozens of factories are turning out thousands of cans of condensed milk every day, putting upon the market over 50,000,000 pounds annually.

The milk consumption requires the use of 5,500,000 cows, aggregating for milk consumption alone 2,090,000,000 gallons, worth about \$167,200,000. Mr. Alvord further says: "Ten years ago there were enormous quantities of skimmed milk, milk from the creameries and whey from the cheese factories which were absolutely wasted." Now, there has been added, in many instances, appliances which make sugar from the milk. The albumen is abstracted for food products and for use in the arts. The casein is desiccated and made into a baking supply and as a substitute for eggs; also as the basis for enamel paint, as a substitute for glue, and is also made into a solid which makes first-class "buttons, brush-backs, handles and electric insulators."

Seventeen million cows must be milked twice every day. Say that one milker could milk ten cows every hour, it would take 300,000 men working ten to twelve hours a day to milk the cows in the United States.

What has stimulated the growth of this great institution, deriving a revenue of over one-half billion of dollars annually? I say that it was and is the Dairy Associations. The activity of this branch has dated from the organization of the Dairy Association, the first of which was organized in 1863. Knowledge was diffused and dairying was made a specialty. Nearly every State, through these Associations, has granted aid and given them the benefit of friendly legislation. And to-day, out of 54 agricultural experiment stations in the United States, 24 have dairying as "one of their principal lines of work." There are now in the United States 64 agricultural colleges and 42 Dairy Associations.

The influence of such organizations can not be weighed in words. The Indiana State Dairy Association has done great work. You are assisting in making Indiana the pride of her citizens as she is now the envy of her sisters. Lake County, which is oftentimes termed the backyard to Chicago, through your influence, has been made first in milk production in Indiana.

We are therefore glad to welcome you, and we trust that you will leave us with nothing but the kindest of regards for our people and its institutions, and again, I fraternally welcome you as our guests.

RESPONSE.

J. V. SHUGART, MARION.

Ladies and Gentlemen and Members of the State Dairy Association of Indiana:

I think that this Association is worthy the attention of all the dairymen of Indiana. Our purpose is to make this a sweet song for the modern dairymen. There are those among us who, no doubt, had to make somewhat of a sacrifice to be present. Having assembled in the honor of the dairymen of this great State of Indiana, who by their presence can not fail to gain more knowledge and learn how to obtain butter fat and more milk, and with less feed and less hard manual labor from the products of our State. We admit it wise and good husbandry to come together at this little town of Hobart and compare ideas upon the different questions of concern to the dairymen, and to further acquaint ourselves with these dairymen of Lake County.

Now, in behalf of the Association, we want to thank the people of Hobart and vicinity for their hospitality which we are now enjoying, and we hope that this Association will lend a strengthening hand to the dairy interests in this locality, and that henceforth the dairymen will work together. Where there is union there is strength, even in the dairy business.

Music—Solo.

PRESIDENT'S ADDRESS.

C. B. BENJAMIN, LEROY.

Some of the questions confronting the dairymen of to-day have been treated upon by my predecessors, yet there remain many problems of as vital importance as any that have yet been treated, and the field is full for those who succeed me.

It is not my purpose to-night to soar above the plain, ordinary dairyman or woman of Lake County in the few candid remarks I have to offer upon a pure, broad, intelligent line of dairying as we see it to-day. The year 1900 finds all agricultural pursuits steadily improving over the past year, and the dairy interests seem to keep pace with the rest. Even this great nation, through its House of Representatives, is on the eve of considering an important dairy measure, and we sincerely hope that ere

another sun sets the "anti-oleo" measure, known as the Grout Bill, to prohibit the sale of oleomargarine colored to imitate pure butter, will have had its just reward, as it means many dollars in the interest of the dairymen of this country, the people who receive the least legislation.

The unceasing labor attending the keeping of cows sometimes shakes the faith of the most sanguine of us all, especially when we experience the first unpleasant weather warning us of approaching winter, with its storms and blustering winds, or in the sunny spring when the warm rains and sunshine start the succulent grasses in the pasture, and the dairy herds are stimulated to a greater performance of their work and there is a drop in the price of dairy products. But with the proper amount of "sticktuitiveness" and an inclination to use the pencil, the mathematical dairyman will figure to reduce expenses, and with a keen, watchful mind and eye be a close student of the requirements of the cow and make her a profitable investment. To be sure she should have care and attention equal to the new beef animal which is grand to look upon, especially the great, fat, good-natured calves. But this is not to be wondered at when we learn that they are led to the stall of the noble old dairy cow for their nourishment. The dairy cow is just as grand to look upon in the hands of a practical dairyman, and in a business way she speaks for herself. It has been proven that there is more profit in dollars and cents in the average dairy cow than in one of the beef type. We can readily discern a dairy locality by the improved fertile condition of the soil, the better buildings, more prosperous appearances in the way of fences, highways, turnouts, and even bank accounts. All these conditions tend to place the dairyman in a position where he may better look after the care and comfort of the cow, the best mortgage-lifter of the present century. Locality, of course, governs the demand for dairy products which must be furnished by some one, and when we stop to consider the millions of people to be supplied with milk, butter and cheese we feel that there is a grand opening for all energetic dairymen, as the products of the dairy are among the most wholesome foods naturally now in existence.

The time is not far distant when right in Indiana, which is destined to be the coming dairy State in the Union, having within its borders several fine markets for dairy products, besides numerous large cities just outside, together with its elegant pastures and good corn-growing soil, the dairy will be looked upon with much more favor than it is to-day, and boys born upon the farm will not be ashamed that they know how to care for or milk a cow.

Consider, if you will, please, the life led by the average dairyman of to-day. He ariseth early, and, going forth, at once he proceeds to feed, milk and care for the mother cow in a way that she repayeth in many fold; aye, at the noon hour he looketh after her wants, and when the evening sun begins to fade, again he ministers to her wants, and not until she is amply provided for does he presume to take up his own abode, fol-

lowed by peaceful slumber. Oh, how sweet! feeling that he has done his duty to both God and humanity; for we think the noble dairy cow stands nearer the threshold of humanity than do some owners. And when he awaketh on the following morn he is met with a look of satisfaction rather than one of neglect and starvation. Such a dairyman will have made the world better for having lived in it, and to him is the community in which he lives indebted for having in its midst a righteous man of sterling worth and integrity who will not scrimp his cow or water his milk. And this same active, wide-awake dairyman will know how to read and reason for himself, using his own judgment as how to legislate to the best interests of the farmer and the true American citizen.

The time has passed by when the dairyman and general farmer may sell off his grain and hay and put his farm, so to speak, in his pocket. This has been done by our forefathers, and we, by the aid of the dairy cow, must replace what has been taken from the soil and leave to our sons and daughters lands rich in fertility. We shall interest them in farm and dairy and encourage them to learn of what elements the soil is composed and how to replace what they have taken away.

We hope that with the coming years and with the increasing demand, the interest in the profession of dairying may grow accordingly, and that our State Legislature may be prevailed upon to appropriate means to help carry out the objects of this Association.

Music by the mandolin club.

LITERATURE.

MRS. J. C. IRWIN, BURTON.

(Mrs. Irwin presented a very interesting address on "Literature," copy of which we were unable to secure.—Editor.)

Music—Male quartet.

Mr. D. W. Willson, of Elgin, Ill.: Mr. President, Ladies and Gentlemen—I presume nearly all of you are more or less interested in the milk problem, whether you are farmers, or whether you are business men, or whether you work in factories. The milk problem begins early in life and continues all through your lives, and therefore you are all interested in the milk problem. Milk is the only perfect natural food that we find on this earth. It is a perfect natural food, capable of sustaining life, capable of giving us all of the elements of nature for our growth, everything we

need to make us healthy and comfortable and happy as children and as grown people. I presume all of these boys that make so much noise here to-night and some of the girls know what it is to be brought up on milk, and therefore the milk problem interests every one, old and young.

Our friend who made the address of welcome, Mr. Conroy, made some remarks about the enormous extent of the dairy industry in Hobart and vicinity, and a few of the figures that he gave I might here call attention to. The number of gallons sent from Hobart to Chicago during the year amounted to 259,000. It was an enormous amount; enough to make a river of milk. There is one establishment in Elgin that takes in as much every week, fifty-two times a year, as you send from this shipping point in a year. You people who are making the milk for Chicago market ought to know a little more about how it is distributed, the method of distribution. If you ship milk that tests from 3 to 5 per cent. butter fat, that is absolutely clean and pure in every way, you ought to insist that it should be delivered to the consumer in like condition. People who have to have milk for babes and invalids, pure, unadulterated milk, should insist upon the dealer delivering to them the same kind of milk you ship to the dealer. What we want in the city of Chicago and all over this country is a law that will compel men to be honest in the delivery of milk. I remember reading not long ago about a case where a law upon this subject had gone into effect and in the course of one year the infant mortality had decreased 25 per cent., meaning that pure milk delivered to the consumers saved 25 per cent. of the infants dying before they were two years old. Now, then, go into the establishments in Chicago handling milk and see the dirt and filth and the methods they use in handling milk. It is no wonder we don't want much milk in our coffee. Then they go along, take off the top of a can and dip out a quart or two; and Chicago air being full of flying dirt, it gets into the can. I don't want to drink that kind of milk and certainly we don't want our children—our very small children—to drink that kind of milk, which has absorbed the disease germs of all kinds floating in the air of Chicago. Professor Plumb spoke to-day about the kind of milk bottle used in Europe. The milk bottle of to-day is of the pattern made in 1878. The same bottle, the same that Chicago has to-day, is used in every milk delivering establishment using a bottle. I had the first mold made for making that kind of bottle. It is the standard shape and size for delivering milk. The milk should be bottled before being sent to Chicago. The proper place to bottle it is on the farm, where the air is pure and clean. Another evil that has grown up in Chicago and for which I think the farmers are to blame is the irresponsibility of the dealer handling the product in Chicago and other large cities. Supposing a neighbor should come over to-morrow and say, "Mr. Brown, I am a little hard up and want to borrow ten dollars," you would say, "Well, no; I can't accommodate you to-day." But whenever a milk man comes over from Chicago and hands you a card and says, "I am Mr. John Brown, keeping a milk

depot at 335 Leavitt Street," or some other place, and asks for milk, you will contract with that man whom you had never seen or heard of and send him milk for a month on credit. This is one of the evils you men can help to correct. I understand that you have not suffered as many losses the last two years as you did before. These are a few things that I want you to think about. It is a fact that the men who deliver milk in the city receive clean milk, but they are giving it to us people in the city adulterated, filthy and unclean. We should try to adopt some means by which our people in the cities can be protected from these evils.

President: We will hear from Mr. Van Norman.

Mr. Van Norman: Just a few words to the younger people present about having a purpose and seeking the education which will enable us to attain our purpose. I am a firm believer in the value of a purpose in life. Young men, set up for yourselves a goal which you may strive to reach. Like a ship leaving a harbor, steering for another many miles distant. The storms of wind and waves may drive her out of her course, but she directs her course anew toward the same harbor, and only occasionally does a ship fail to reach her objective harbor. So the young man who selects for himself a desirable goal, and continually strives to reach it usually does. Don't make money—money alone—the goal. Ask yourself what line of work you are best fitted for, naturally, by training and environment, then educate yourself for that work, be it farming, dairying, gardening, law, medicine, railroading or any of the many other lines. Don't be a lawyer or a farmer because your father was one, if you are not fitted for it and don't like it. But having selected your occupation by choice or necessity, be the best member of it your strength and brain will permit.

If you are going to be farmers, study farming, at Purdue or elsewhere; if you are going to be lawyers, go to a law school.

Right here let me give you an illustration of the value of an education. How many of you are able to sit down at this desk for four hours together and think—think along one line of work? I think most of you would give it up as a bad job after a short time. We heard that address of welcome. It was given by a lawyer. I don't suppose that he ever studied farming, but he gave us a good many points on agriculture and farming. Why do we see men of that profession occupying so many of the seats in our legislative halls? Why do the farmers kick about it and ask, "Why don't they get farmers in Congress? Why is it these men are there?" It is because they have learned to think. The law business compels a man to think—think how to beat the other fellow. He has got to win the case some way; that is what he is paid for. And just as a man gets strong muscle by lifting rocks every day, he can turn around and lift a stove, lift other material with the same muscle. The lawyer gets a strong mind by thinking law, and he can apply that ability to think to many other

subjects. When we go to school we think out a problem in geometry. It is not always the geometry that helps us, but it is the ability to think that problem out, which we use when we go on the farm and think out a balanced ration or other perplexing question. It is the thinking that gains in the long run, it is not the geometry. I know by experience, for I have been through it.

Finally, young men, have a purpose. Train and educate yourself for its accomplishment. Be the biggest, best man in your chosen line of work that you are capable of being. Save a small proportion, if only one per cent. of your income, no matter from what source, and put it away for the day of adversity, should it ever come. If you will do this, chances are it won't come.

Music—Piano solo.

The convention adjourned at 10 o'clock Wednesday evening, December 5, 1900.

THURSDAY MORNING SESSION.

December 6, 1900, 9:30 a. m.

SOILING AND SOILING CROPS.

C. E. SMITH, AINSWORTH.

Mr. Chairman: I don't expect to say a great deal on this subject. I supposed that the gentleman from Indianapolis who was at the head of the list would exhaust the whole subject. My experience has been somewhat limited and mostly confined to the use of corn for soiling purposes, and that is pretty nearly all that I can talk about. There comes a time every year when the dairyman is under the necessity of furnishing something to keep up the flow of milk, and my experience, as I said before, has been with corn only, or nearly so, and we have to commence, of course, preparing for this shortness of pasturage early in the season in order to meet it when the time comes. And in preparing the land for corn for soiling purposes, it is necessary to have it rich so as to produce large crops and have it thoroughly prepared. After you get it in pretty good shape it will do no harm to go over it again with some fine toothed instrument to get it in extra good order. Then, when you go to planting, be careful not to plant it too thick. My experience with corn that is planted so thick that the

lower part of the stalk is white or light colored is that the cattle don't relish it so well. After corn is planted it needs sunshine and good weather to develop it. I planted a piece in the ordinary time, and having heard it said that it was a good idea to go astride each row and plant it just as thick again, I tried it, and the consequence was I had an immense growth of corn upon the land, but the quality was very poor; about one-half of the lower part of the stalk was white or light colored, and this the cattle don't relish. That cured me of planting it so thick. I wouldn't plant more than about twice as thick as I would to mature a crop of grain. We get, of course, a larger amount of stalks where it is planted thicker, but I think the quality is enough better when not so thick and the cattle relish it enough better to make up for the difference in the quantity. Of course, you that have tried it are aware that cows will eat a large stalk of corn, half as large as your wrist, and some nearly the whole thing until it gets pretty well matured. Of course, after it gets so far matured that they will not eat the upper parts of the stalk readily, better plant some a little later to commence to feed at that time. You want to keep the condition of the feed so that the cattle will relish it. And in feeding this corn it is a good idea to feed a little quantity of bran with it, especially if you have to commence before the corn is well matured. Be sure to plant plenty of it so that you will have enough to feed, and if you have a little left that you don't get fed out, it will make excellent fodder. It is policy to plant as early in the season as it is possible, and have a succession of plantings, say two weeks apart up to the first of July, for instance. In that way you have feed in the best possible condition for the cattle, up until the frost comes, and whatever is left, can be utilized—cut for grain corn. The past season I planted considerable more than I needed. We had considerable rain and the pasture held out better than usual, and the corn didn't have to be fed, and, of course, matured. We cut it up and husked it and got probably forty bushels to the acre of grain. Of course, the ears were small, but sound, and we also got a large amount of fodder. The corn was planted on an average of about fifteen inches apart in the rows. In feeding my experience has been to cut the corn and load it on the wagon, and draw it into the pasture and scatter it over the clean parts, and the cows will pick it up from there. Until it gets pretty well matured they will eat the whole of a large stalk, providing the stalk is green. You do not want it so thick but what the stalk is green the whole length of it. Wherever it is so thick, as I said before, that the lower part of the stalk is white, my experience has been that cattle will universally refuse to eat that part of it. Before the corn matures sufficiently to feed, it is necessary to use something else. Of course, I have had very little experience in that. I have used oats the past season. I went into the oat field and cut the oats down but did not bind them. We cut enough one day for two feeds. We left them in the bundle and they didn't cure out so but what the cattle ate them readily the second day after cutting. I have

sometimes had access to a millet field. We sometimes grow millet and cut some to feed the cattle and they eat it readily, and that comprises my experience in partial soiling. And so the conclusions that I have arrived at are to thoroughly prepare the ground, make it rich, pulverize it thoroughly, and after the corn is planted use some fine-toothed implement, a fine-toothed harrow, and go over it to keep the weeds down. And then take a weeder if the ground is dry enough and in suitable condition to work and go in any direction you please; it will not injure your corn any. It has a tendency to retard the growth of the weeds. You can keep working the weeder until the corn is eight or ten inches high, and the closer you keep to the rows and the more times you work it, the more growth you have and a better quality also. I believe that comprises my experience in the matter of soiling, so I will leave the subject to others.

Mr. S. B. Woods: Mr. Smith has pretty well covered the corn question, though I believe in having sowed corn for early feed. Mr. Smith didn't say anything about the variety of corn. An early sweet corn matures earlier than the field corn. It wants a pretty dry soil for sweet corn. Most of the varieties of sweet corn grow sooner than the field corn. We had at one time what is called the Mammoth Sweet Corn, and it made an abundance of feed. It was lower than field corn, more milky than the field corn in the early stages, in the early part of the season. But for a crop before the corn gets to a feeding size, oats and peas are a valuable crop for soiling. We have sown them for six or eight years I think. Sow them on good dry land. First cultivate the ground or disc it and then sow the peas broadcast. If you sow the peas on a smooth surface the peas are so heavy they will roll up in bunches. Cultivate the ground—run the disc harrow over it and when you sow the peas they will stay right where they fall. They won't roll as they will where it is smooth. Sow them that way and get a gang plow and plow them under three inches deep, and then sow the oats on the top and drag them in. It makes an abundance of feed. It gives a great deal more bulk than the oats alone and more feeding value. The oats and peas get ripe sometimes, but while they are green they make a nutritious feed. If you have more feed than you want and the silo is filled up, put them in the barn for hay; they make valuable hay for the horses and cattle. By the time it is out of the way you can have early corn. For a later feed we use a great deal of sorghum. For feeding I would rather have sorghum and corn than corn and oats as dairy feed. But I think the cow likes a variety as well as anything else does. If a person should have just one kind of food a change often tastes good. We like a change, and it is the same with the cow. When we have been feeding corn alone and come to feed them sorghum, they leave the corn and come for the sorghum, so the variety is good, I think. For making a variety and having it mixed without any trouble, we plant the corn and sorghum together, and it grows as well together as when planted sepa-

rately. In feeding sorghum and corn mixed, with us I believe it produces more milk than corn alone.

(Question by some one in the audience: What proportion of corn and sorghum? Answer: Half and half.)

A year ago last summer my milkman induced me to plant some sunflowers. They are a nice looking crop when in bloom, and they produce considerable feed. We cut them up and the cows ate them all but the butts of the stalk. They ate the seeds all right and seem to have done well. We fed pretty heavy and they didn't last long, and so we didn't thoroughly test them. We should have thrashed them out and fed in smaller quantities. (Question: What would be your idea as to corn and sorghum for silage?) I haven't tried it. In some parts of the country they use sorghum extensively. In feeding this it is the best way to make a big pen and have the bottom rail of this pen three feet from the ground, and around that we build a rack two and a half feet high. We haul a load and throw it into this pen, and they reach from the rack under the pen and empty that rack out without any further feeding. The rack keeps it away from the cows. It is a much easier way to feed than in the stable. It seems to me that the Canada peas and oats are not used as much as they ought to be by dairymen. It is a rich feed and makes an abundance of it. We have at times run out of peas and oats and had to feed the peas alone, but they like the peas and oats best.

Mr. Shugart: I don't know that I can add anything to what has been said. I might give a little of our experience, which is rather limited, on the silage question. We grow corn as our principal feed. We never grow any peas or oats or anything of that kind any more, except just for hay. For fall feeding, if we want to feed before the corn is matured enough to feed, we cut a little patch of oats and scatter them in the pasture. But I think the best plan we have tried is to have a summer silo for the cows. If you haven't that, as soon as your winter silo is empty you should have green corn to commence feeding. Last season we had about three feet left in one of the silos, and when the grass began to fail, we uncovered it and fed it to the cows. We got better results from the cows when the pasture was short and the flies were bad, than while the pasture was good, and as soon as the silage was gone the green corn was ready to cut. Such silage as is gathered up while we are running into the silo, we feed. When the silo is filled then we move around to the other side of the barn and run in the sugar corn, which comes in a little later than our common corn. We continued to feed on the sugar corn until it got too dry, and then we used sorghum. I liked it very well for fall feed. I don't know that it has any particular milk qualities, that is, for producing gallons of milk, or whether it gives a good quality of milk. I think that is all I can say on the sorghum question.

DISCUSSION.

Mr. Knox: I would like to ask Mr. Shaffer if he ever had any experience in sowing clover?

Mr. Shaffer: No, I never had any experience with clover. The fact is, the last few years in our vicinity it has been very hard to get a catch of clover. We haven't raised any wheat the last ten or twelve years—since we have been in the dairy business. We haven't enough land for the amount of corn we need, and hay and such as that, to spare it for wheat. It has been too dry to get a catch of clover in the stubble; that is one reason for mowing oats for hay. If I understand the theory of the grain of oats, it requires about eighty-two parts of water to one part of dry matter to mature the grain of oats. Consequently, if you let the oats stand until the oats are matured, it takes so much moisture from the ground that the young clover is burned up by the hot sun when the oats are taken off.

Mr. Knox: This is after the oats are taken off?

Mr. Shaffer: Yes. That is the reason we adopted the plan of mowing the oats while in the dough and curing like hay. Then get in with the hay tedder the same as you would in hay, and put the hay loader behind the wagon. This makes a hay that our cows relish fully as well as any clover we ever had.

Mr. Willson: In speaking about sweet corn and field corn, I want to give an experiment tried by a friend of mine in the East. He had been feeding the ordinary corn for three or four weeks and then he turned off on to sweet corn as an experiment, and inside of two days his forty cows had gained a quart a day. This shows the difference in the amount of milk produced by sweet corn and ordinary field corn, and gives an illustration of the difference in feeding value of sweet corn and field corn. After that he always raised sweetcorn for sowing purposes. His milk, taken to the creamery, went up a quart to the cow on an average.

Mr. Woods: I want to say further that this summer we cut the oats and peas early and then plowed and sowed Hungarian. I don't think it would do every year. This year was very favorable for the Hungarian. In regard to sowing clover with rye, we can't get clover to catch with oats. We have given it up. We can't do it. I am going to try sowing rye and clover with it—clover with rye. And by soiling the rye we can get a catch in that way all right, but with oats it is a failure with us.

MILK FOR THE BROOD SOW AND PIGS.

C. W. APPLGATE, HEBRON.

The importance of swine raising in connection with the dairy is well understood by most of our dairymen, and those who do not ship milk make good use of the byproducts of the dairy—in feeding calves and hogs.

My experience has been that milk has the greatest value when fed to the brood sow and pigs. It has a tendency to keep the brood sow in a good healthy form. If the dam be healthy and vigorous we may expect the pigs to be also. Then with plenty of feed that will produce milk for the pigs they will thrive beyond anticipation. Milk with wheat middlings is the best thing that I have ever used. With a generous supply of milk and wheat middlings I have often enabled a young sow to rear a brood of ten or eleven pigs.

When the pigs are three weeks old, give them a trough by themselves, add some fresh milk from the cow, and in a short time the pigs will eat more than half what they need, thus relieving the dam of one-half of her work. In a very short time they will relish skim milk, and to this may be added a mixture of crushed oats, rye and corn, or a combination of either two.

I have no data showing the comparative value of milk with other feeds, but know the results are satisfactory when the milk supply is good. The conclusion is then, reserve the milk for the brood sow and pigs and give them corn in a more liberal supply later.

In this connection I want to speak of the importance of green feed for the hogs, as well as pigs. I don't think hog raising can be made profitable upon a strictly grain diet. There should be a generous supply of green feed during the spring and summer months.

Bluegrass, clover, rye, rape, peas, oats, alfalfa, and anything that your land will produce. We must furnish the young hogs with muscle and bone producing foods first, then that cheapest and best of all fat-producing grain, corn, will finish the hog in the best and cheapest possible way.

SOME OF THE POINTS TO BE DESIRED IN A DAIRY COW.

M. A. SCOVELL, DIRECTOR KENTUCKY EXPERIMENT STATION.

The first point to be considered in selecting a dairy cow is her capacity for milk and butter. A cow that gives a good average flow of milk, rich in butter fat, is to be preferred to one that gives a very large quantity of milk when fresh but is dry three or four months of the year. These statements are axiomatic. The problem is to select and breed such cows. If from external appearances, the capacity of a cow for milk and butter could be determined, more than half of the cows of this country would go to the shambles. There have been those who thought they had discovered by some outward appearances the secret by which one could tell how much milk a cow would give, the continuation of its flow, and its richness as well. Probably the most elaborate theory propounded in this respect was that of Guenon. This theory was based upon the position of the hairs on certain parts of the body. Guenon noticed that the cows of Flanders, which are noted for very large flow of milk, had well defined escutcheons, that is, the hair on the back udder and above, and extending out on the thighs, as well as extending over on the fore-udder and on the belly, was inclined in the opposite direction to the hair on the body. From a number of trials, he came to the conclusion that by the escutcheon one could tell the quantity and quality, and the continuation of the flow of the milk of any cow. This theory spread all over the world, and it even has its advocates to the present day. Experience, however, has shown that while a cow with the finest escutcheon generally has other qualities making her a good dairy type, there are fully as many, if not more, cows with poor escutcheons, which are great milk and butter producers. A cow with a good escutcheon may or may not give a large flow of milk, which may or may not be rich in butter fat, and the flow of milk may be continuous or not.

Other external marks have been used to more or less extent to show dairy qualities. Some lay great stress on large milk veins and milk wells, and others by the skeleton make-up of the cow. Those who judge of the capacity of a cow for giving milk by the size and condition of the udder, come nearer guessing, probably, than those who advocate other external appearances. It is a fact that of the 45 cows which we have tested for butter, but few have shown large, or tortuous milk veins, and many have had small milk veins. One of the best cows our station ever owned was parallel bodied, with thick neck and heavy shoulders, and carried when not in full flow of milk, a great deal of flesh. This cow for five years averaged over 500 pounds of butter a year and some 10,000 pounds of

milk. In the World's Fair test the champion cow, Brown Bessie, had a short, thick neck and a fleshy udder.

In our experiences at the Kentucky Experiment Station in handling cows giving large quantities of milk and butter, those having large udders that milked out well generally were of the best, but four or five exceptions out of some 40 cows did not prove the rule accurate enough to base the selections of dairy cows on udder alone. The true dairy type, the thin necked, sharp shouldered, deep bodied, straight backed, broad hiped, long rumped, short legged, large uddered, mellow hided, silky haired cow falls so often to enhance the profits of the dairyman—that she is so often the exception to the general rule that it can not be strictly adhered to in selecting profitable dairy cows. The scales and the Babcock test are the only guides. Then there are two kinds of profitable dairy cows—the ugly and the beautiful. The Babcock does not discriminate between them; the artistic eye does. The one detracts from the herd and the other makes the owner proud to show his herd. The one receives the scoffs and kicks, and the other is the pet of the whole family. These two types may be the representation of two herds. Which herd is to be preferred? The combination of the scales and the Babcock and the scale of points of outward appearance gives the ideal dairy herd. The question then is, what is a beautiful cow? Beauty is comparative. Mr. Warfield, a familiar name the world over among Shorthorn people, said to me once just after the blue ribbon had been tied on one of the truest dairy types I have ever seen, Lady Drummond, an Ayreshire cow, "What a pity she is so ugly." In Austria, Shorthorns are bred to the dairy type. Herr Prof. Dr. Wilkins, professor of animal physiology for the Austrian government, visiting me some few years ago, carefully examined Mr. Warfield's unbeaten Shorthorn bull. "What do you think of him?" said Mr. Warfield. Shaking his head, Professor Wilkins said: "He is beef ugly."

The true dairy type, therefore, is that type which, generally speaking, can be relied on to produce the greatest quantity of milk and butter and cheese. A large udder in the dairy cow attracts the eye; a large symmetrical udder, with smooth, medium-size teats well and evenly placed on the udder, the udder covered with the finest of hair, with a kid-like hide, richly yellow in color, is beautiful; large tortuous milk veins, extending well forward, with veins spreading on the udder, adds beauty. A cow with small horns, artistically curved, bulging eyes set wide apart, looking rather witchingly, but not timidly, showing no signs of fright; a head that shows a large brain; a face smooth and covered with veins; a thin, rather long neck, set on the shoulders compactly, without beefiness, with a clean throat, a wedged shoulder, a perfectly straight back to tail, ribs bulging and flat, loins wide and flat rather than like a roof, and extending well out toward hips, hips prominent and wide apart, rump long and as high as hips, tail long and with a fine switch, legs short, bones flat and fine, thighs thin and flat, muscular but not fleshy, body large and wedge shaped, hair

smooth and silky and short, hide wrinkly and oily; all these go to make up the typical dairy cow. Such a cow is beautiful. She may or may not be a profitable dairy cow. Some such cows and perhaps the great majority of such cows are profitable. Those possessing outward dairy points, and with all giving a large profit at the pail and churn and vat, should be selected for breeding purposes.

I believe in utility and beauty, the combination of these. I believe that the farmer should be as proud of his herd as the artist of his picture.

[Pictures of the following animals were shown on a screen by means of a lantern, Professor Scovell commenting on various points as they illustrated his argument.—Editor.]

1. Diagram—poor udder.
2. Diagram—good udder.
3. Poor udder—Lady Mary.
4. Good udder—Fillpail 2d.
5. Model cow—Jersey Bell of Situate.
6. Beef type.
7. Guernsey cow—Purity.
8. Guernsey cow—Jeweller's Jessie.
9. Guernsey cow—Rosette 5th.
10. Guernsey cow—Rutilla's Daughter.
11. Guernsey bull—Lord Stranford.
12. Guernsey bull—Sheet Anchor.
13. Ayreshire cow—Gladys Drummond.
14. Ayreshire cow—Lady Essex 3d.
15. Ayreshire cow—Bonnie Amie.
16. Ayreshire cow—Red Rose, imp.
17. Ayreshire cow—Duchess of Smithfield.
18. Ayreshire bull—Ossidine.
19. Ayreshire bull—Sir Hugh.
20. Ayreshire bull—Innerness.
21. Shorthorn cow—Kitty Clay 4th.
22. Shorthorn cow—Kitty Clay 3d.
23. Imported Shorthorn.
24. Holstein cow—Inka 4th.
25. Holstein cow—Clara Vaughn.
26. Holstein cow—Taconia.
27. Holstein cow—Lady Asher.
28. Holstein cow—Pauline Paul.
29. Jersey cow—Princess 2d.
30. Jersey cow—Landseer's Fancy.
31. Jersey cow—Lilly Flag.
32. Jersey cow—Ida of St. Lambert.
33. Jersey cow—Mary Ann of St. Lambert.
34. Jersey cow—Oxford Kate.

35. Jersey cow—Coomassie.
36. Jersey cow—Duchess of Bloomfield.
37. Jersey cow—Eurotus.
38. Jersey cow—Ooman.
39. Jersey cow—Flora Temple 3d.
40. Jersey cow—Hugo Countess.
41. Jersey cow—Stoke Pogis Regina.
42. Jersey cow—Romp's Princess.
43. Jersey cow—Islip Lenox.
44. Jersey cow—Merry Maiden.
45. Jersey cow—Brown Bessie.
46. Jersey cow—Ida Marigold.

DISCUSSION.

Mr. Woods: I would like to ask if you think a man can judge a little calf whether it will be a good milker; whether there are any points about the placing of the teats and the general makeup that will indicate its ability as a cow?

Professor Scovell: I used to think I could, but sometimes I miss it. I told one lady who had a heifer, after I had looked at it, that she had better send it to ———, and she came pretty near doing it. But it turned out to be the best cow she had.

Question: Can you develop a dairy heifer and make her a better cow than she would be if left in ordinary hands?

Professor Scovell: What you want to know is whether she is a mere machine, or whether she is made by the breeder, or breeding. I believe she is bred. We can't make her what she is not.

Mr. Woods: Beyond what age can you commence to correct the beef tendency in the cow?

Professor Scovell: I believe same can be corrected. You get a Short-horn heifer and breed for beef and you will get a beef type after a time. I also believe you can overfeed a dairy heifer.

Mr. Willing: At what point would it be impossible to correct that beefy tendency? I suppose that tendency in form of the heifer would be hard to correct.

Professor Scovell: I think that is so. I have seen helpers that were quite fleshy become thin and all right after calving, but I don't believe in starving a heifer to prevent her getting too large. This excess of flesh will go to milk.

Mr. Willing: The point of the flexibility of the skin and the shining color and the easy handling, does that indicate high living power?

Professor Scovell: Yes; a good constitution. I like to see a dairy cow with a good constitution.

SOME GOOD THINGS ABOUT THE SILO.

WILLIAM SYKES, HOBART.

Everything is good about the silo except the raising of the corn and the filling of the silo, and that is also good to the man that has the right kind of push and energy to manage the work. It is true there are some discouraging features in the work, the same as all such work, where we have to employ machinery to accomplish it. I would say to any man who contemplates building a silo to be very careful in selecting a machine to do the work, as there are machines on the market that are made only to sell and try the patience of the man who buys them and tries to use them to fill his silo.

The cost of silage will naturally vary according to conditions.

I will give you some figures showing actual cost of silage per ton that I put up last fall:

Rent of 18 acres, at \$3.00 per acre.....	\$54 00
Plowing same	18 00
Planting	4 00
Cultivating and harrowing.....	22 00
Cutting and binding, 18 acres.....	18 00
Engine and cutter, 4 days.....	20 00
Eight men 4 days, \$1.00 per day.....	32 00
Boarding 8 men 4 days, at 50 cents.....	16 00
Total	\$184 00

My silo is 19x18x27 feet, making 9,234 cubic feet. Counting 40 pounds to the foot, gives it a capacity of a little over 230 tons of silage, at a cost of \$184, which is exactly 80 cents per ton.

Notwithstanding the fact that I own the land and machinery that I have employed in bringing about these results, I have placed myself in the same position as the man who would have to rent them, and have charged myself with the same expense as the renter would have to pay.

The reason I take this position is because I have often been told that a man could not afford to hire machinery to fill a silo.

If some party representing a Chicago brewery would come into the country and offer to sell brewery malt at \$2.50 per ton, these same men that argue against silage would be tumbling over one another trying to get a contract to take a ton or two each week, and haul it through the mud at any and all times, whether they have got time to bother with it or not, and possibly make two or three trips in succession before they get anything, where with the silo they would have a much better feed ready and handy at all times at a cost of 80 cents per ton.

For the benefit of those who might be interested and would like to get an idea of the feeding value of silage, I will offer some figures along that line.

As I before stated, I put up 230 tons of silage, or 460,000 pounds. Sixty pounds of silage is generally recognized as a day's ration for a cow.

Then I have silage to feed 40 cows six months and about eleven days.

The actual cost of a day's ration of silage is exactly 2½ cents. This, divided into two feeds, one in the morning and one at night, with about 2½ pounds of bran added to each feed, will make a ration that is as good and cheap as any I have ever discovered.

We see, in different parts of the country, silos that have been built and used for a few years and their use discontinued, and the reasons for this are various. Some have gone out of the dairy business, others haven't the energy to get a hustle on themselves when the time comes to do the work, and still others have stuck to the idea that it takes green corn to make silage, or their silo is not properly constructed and lets the air in and rots the feed, and consequently the whole business is condemned as a delusion and "I told you so."

The reasons for success are few and very simple. First, we must have a silo that is air-tight and strong enough to stand the immense strain that they are subjected to. Second, and last, we must fill it with ripe corn that is free from weeds or any foreign substance that is liable to give the silage a bad odor.

No corn is ready for the silo until it is ripe enough to shock, and no corn is ripe enough to shock until the husk begins to dry.

DISCUSSION.

Mr. Willing: I take exceptions to the last statement as to the time of cutting silage. The teaching that I have received is that it should be done when the internal part of the kernel has begun to glaze.

Mr. Sykes: That is the mistake, Mr. Willing, that a great many people have made. Eight years of experience proves to me that you want the

corn ripe. If you put green corn into the silo, the sugar will turn to acid and you will have a sour silage. I can tell sour silage as far as I can smell it.

Mr. Willing: If you have a dry season there is less sap in the corn; would there not be an excess of air in the stalks?

Mr. Sykes: There must be enough sap in the stalk to cure it.

Mr. Woods: I would like to ask Mr. Sykes if he figured the amount of silage when full or after it had settled?

Mr. Sykes: I figured on it after it was full. In the first place we filled it as full as we could get it conveniently, and then went over and filled one of the neighbor's. We then came back and filled it clear to the roof. After it had settled down, we went to work and put four loads in that we had left in the field, so I know it was full.

Mr. Woods: That cost 80 cents a ton—all the time taken into account only cost you 80 cents a ton?

Mr. Sykes: Yes; I figured everything as high as one could. I don't believe I left anything out.

Mr. Woods: What is the cost per acre for raising corn?

Mr. Sykes: I didn't figure for one acre. I figured for eighteen acres.

Mr. Woods: Well, I think you got that a little low. You haven't anything down for seed.

Mr. Sykes: I don't think I figured on that item.

Mr. Woods: That gives a cost of \$5.49, the cost of raising an acre of corn.

Mr. Van Norman: I think that is too little. Your figures for rent, plowing, planting, cultivating and cutting would make it cost \$10.00 per acre.

Mr. Woods: How many tons of silage did you have?

Mr. Sykes: I had 230 tons and a little over. I figured it at 40 pounds to the cubic foot.

Mr. Woods: Isn't your estimate to the cubic foot rather high?

Mr. Sykes: I will tell you why I did that. I feed it to the cows and let them pick out the best and let the rest pass on to some stock that I don't care to feed so heavily, and in that way I feed up everything.

Mr. Willing: In facilitating the low cost of raising a crop of corn, I have used a four-horse drag after planting, taking twenty feet to a sweep. In cultivating the top once I use the weeder and take two rows at once.

Mr. Sykes: Now, in the matter of plowing that field, I put the plowing at its actual cost. I put one man and four horses in there with a gang-plow, and he plowed the field in three days. And \$18.00 for three days' work is a little high.

Mr. Woods: Did you have three horses or four horses?

Mr. Sykes: I had four horses on the gangplow.

Mr. Woods: It would be much cheaper, then, for you to do it with one team. As to the matter of building a silo, of course I will have to say we have a great many men in this part of the country who are enemies of the silo. They claim that a man that would build a silo must be "a little off." They come around sometimes when you are filling the silo and say, "My gracious, are you putting that corn into the silo? That must be an awful waste. Why don't you husk that corn? You are wasting all your time and corn." We hear that often. But I was going to say about the construction of a silo. I know some of our public educators did a good deal in discouraging the idea that almost anything would do for a silo. That the outward pressure of the silo was nothing. The pressure was all downward. My experience has proven that there is an immense outward pressure. I have a silo 27 feet on top and I want to show you the immense outside pressure there is. It was made very strong—made of 2x8 studding put 2½ feet apart. The first season we filled it, when we got up part way, when it was about two-thirds full, I saw it was going to get away from me. I stuck this studding on sills 8x8, and the pressure commenced to go out, and I took one-foot planks and set them edgewise against it, and put five of those planks about five feet from the ground where the greater part of the pressure would come. Those planks, mind you, five of them, sprung out so that they were out in the center five or six inches further than they were at the ends. This season I was filling it up fuller than I had before, but when we got up near the top we saw there was an immense strain on it. We cut it finer than we usually do, and the finer you cut it the greater pressure there is. I sent my hired man to the woods to get some long poles, and we took them and braced against the planks to hold it together. Before we fill it another season there must be something more done to strengthen it.

Mr. Willing: Don't you think the fineness, excluding the weather, allows cutting it later?

Mr. Woods: Yes; no doubt the finer you cut it the longer you can keep it.

Music—Vocal solo.

The following committees then made their reports, which were accepted:

The Auditing Committee finds the Treasurer's report and books correct.

J. M. KNOX,
SAM'L SCHLOSSER,
G. W. DRISCHEL.

The Nominating Committee reports the following:

For President, C. S. Plumb; Vice-President, J. M. Knox; Secretary-Treasurer, H. E. Van Norman; Member of Executive Committee, the officers and Sam'l Schlosser and A. J. Newsom.

The Committee on Resolutions reports the following:

Whereas, Oleomargarine is now made in the color and semblance of butter and in parcels and packages the same as butter, and

Whereas, It is so colored and put up as to deceive purchasers into believing that it is butter, and is being more and more extensively sold as and for butter, to the great injury of the dairy industry of the State of Indiana, and is likewise so generally sold for butter that it is an injury to the dairy interests of every State in the Union, and

Whereas, State laws have been so far so successfully evaded and set at naught as to make it immediately important that the national Congress recognize the evil and provide a speedy remedy, therefore, be it

Resolved, That we, the members of the Indiana State Dairy Association, do most strongly urge the passage of the Grout Bill, H. R. 3717, and that we request and instruct our Congressmen and Senators to vote for this measure and do all else in their power to bring it to a successful passage as a measure due the great dairy interests in protecting the honest sale of pure products in our markets; and be it further

Resolved, That a copy of this resolution be forwarded to each Indiana Representative and Senator in Congress and be also spread on the report of proceedings of this, our eleventh annual convention.

Resolved, That agriculture is a science, and it is the sense of this Association that it be taught in our public schools as one of the branches.

Whereas, The dairy interest of this State is of such vast importance, and the State Dairy Association is such a prominent factor in placing that interest on an intelligent basis,

Resolved, That we ask the State Legislature, as a matter of justice, to appropriate a sufficient sum of money to pay the necessary expenses of this Association from year to year.

Resolved, That the thanks of this Association are due and are hereby tendered the officers of this Association for their faithful and efficient management of the affairs of the Association.

Resolved, That this Association highly appreciates the efforts put forth by the people of Hobart for our entertainment, and we especially extend a vote of thanks to the Hobart Band, the Mandolin Quartette, the Ladies' Quartette, the Male Quartette, Mrs. Smith and Mrs. Jory and Mrs. Werner and Miss Banks and Professor Sholler for their splendid musical festival.

A. J. NEWSOM, Chairman,
N. P. BANKS,
SILAS HOLLOWAY,
H. H. WILLING,
J. V. SHUGART.

FEEDING.

PROF. M. A. SCOVELL, LEXINGTON, KY.

It is not my purpose to-day to enter into a discussion of the scientific principles of feeding. Professor Henry, in a most comprehensive and excellent book on feeds and feeding, discusses thoroughly the theories of Wolf, Kuehns, Lehmann and other scientific writers, and those who are not perfectly familiar with these German feeding standards, I gladly refer them to Professor Henry's book. This book should be in the hands of every intelligent cattle-feeder and raiser.

There are two ways to look into the feeding question. To a scientific investigator, the rational way would be to find out, for instance, what materials the carcass of a cow is made of—say on a basis of a thousand pounds, how much dry matter, how much flesh forming substance, how much fat. The next step is to ascertain the amount of these substances which is required to keep a cow of a thousand pounds weight at that weight. How much dry matter should she eat a day to maintain herself, how much protein or flesh-forming substance should she eat to keep up her muscles and nerves, how much starch, oil and fat should she eat a day to keep up the animal heat. Having found this, the next step is to know how much food is carried away in the milk that she gives. Adding these two together, we would get the amount of food that a machine cow would require to maintain herself in perfect health and to furnish the amount of milk she gives per day. Wolf and other scientific German investigators, after a thorough investigation and repeated trials, came to the conclusion that a cow giving 22 pounds of milk per day, has to be fed 29 pounds of dry matter, 2.5 pounds protein, 13 pounds carbohydrates, and $\frac{1}{2}$ pound ether extract of fat. This gives a ratio between the flesh-forming foods and heat-producing foods of 1:5.7, and this is designated as the

nutritive ratio. Theoretically, therefore, any dairyman who mixes his feeds in such a way and amounts as to produce this standard, would be giving an ideal ration. But this considers the cow as a machine. It does not take into consideration the idiosyncrasy of the cow or the palatability of the food.

The other way in which to study the feed question is to study the preference of the cow herself for the different feeds, and to give her all she will eat profitably. A combination of the two methods will probably be the method generally accepted in the near future for feeding dairy cattle.

In what little I have to say to-day, I will give results based on the test of individual cows for milk and butter. This station has made some 45 official tests of dairy cows; besides, we have had under observation for six years from five to fifteen cows in our dairy herd. The milk records, the butter-fat records, and food records have been carefully kept. My remarks to-day, however, will cover cows under test for 14 pounds of butter or more per week; the object being in these tests, of course, to feed the cows all they would eat, or at least to feed them so they would produce the maximum amount of milk and butter. In making these preliminary tests, nearly always the weight of the cow has been maintained during the test. Feed was gradually given each cow under test as long as she increased in milk and butter. In most every instance under observation, there was always a maximum amount of feed beyond which no increase of butter or milk could be obtained, but usually a decrease was observed. A cow, therefore, was fed during the test as much food as she would eat to increase or maintain her maximum milk flow and butter production. Clover hay or pasture was the roughness used in the feed at all times, except that now and then corn silage was fed. When clover hay was fed it was at the rate of ten pounds per day. Corn meal or corn hearts and bran were two of the grain rations most always used. Oil meal and cotton-seed meal were used where an increased butter production could be had by its use, and were not objectionable to the cows under test. Often, however, a cow refused food if oil meal or cotton seed meal was used. At least is this the case until a cow gets used to such food. In a long continued test of a cow, her condition was considered in feeding corn meal and cotton-seed meal and oil meal. When near to the calving time, no cotton-seed meal or corn meal was fed. In making these tests, no special regard was taken of the nutritive ratio, the object being to study from individual cows under high tests what ratio protein had to carbo-hydrates, or in other words, whether the Wolf-Lehmann standard could be accepted as a true guide in feeding dairy cattle for milk and butter production. I give in the following table results of eleven tests. It will be noticed that in all of these tests, the cows are under observation for more than a week, and one for a year, and that the milk produced averaged over 30 pounds per day. The nutritive ratio

varies from 1:4 and 1:6.4. This does not include, however, the food from pasture or clover hay. Clover hay has a nutritive value of 1 to 5.8. The blue-grass pasture varies in its nutritive ratio so that no definite results can be obtained. I give more in detail the results of Dollie's Valentine, which are based upon a year's test.

CONCLUSION.

If any conclusion can be reached from such results, it will be that a ration for a dairy cow, producing two pounds of butter or more per day, should contain about 8 pounds of corn meal and 8 pounds of bran, which might be supplemented advantageously with 1 pound of oil meal and 1 pound of cotton-seed meal, and clover hay or pasture ad libitum, and such ration might be increased if by so doing the flow of milk was increased. As long as the cow increases in the flow of milk, she will not increase in weight to any great extent. When the flow of milk decreases (due regard being given to the period of lactation), the food ration should be decreased, taking at first the cotton-seed meal, then the corn meal, feeding no cotton-seed meal nor corn meal at the calving time.

COW	YIELD, AV. DAILY.		GRAIN FEED, LBS.							CLOVER.	PASTURE.
	Milk.	Butter, lbs.	Corn Meal.	Corn Hearts.	Bran.	Oil Meal.	Cotton-seed Meal.	Total.	Ratio.	Ratio, 1:5.8.	Ratio, 1:8.7.
Oona B	31.9	2.09	.....	4.80	8	.....	.....	12.8	1:4.8	.....	Pasture.
Amanda	37.9	2.13	4	.....	4	1	.....	8 1/4	1:5.8	.....	.....
Onette	44.4	2.22	6	.....	8	.....	.....	14	1:5.7	.....	Pasture.
Bluster's Pipp.	36.6	2.39	.....	6	8	1	.....	15	1:4.3	.....	Pasture.
J. P. 2d	36.6	2.08	8	.....	10	1	1	20	1:4.6	.....	Pasture.
A. D.	35.7	2.01	8	.....	10	.....	.....	18	1:5.7	.....	.....
M. S.	45.4	2.56	10	*4	4	2	2	22	1:4.6	.....	.....
S. A.	39.8	2.30	4	4	3	.....	.....	11	1:6.4	.....	.....
L. D.	36.1	2.07	8	.....	8	2	2	20	1:4.0	.....	.....
B. J.	40	2.40	8	8	8	†10	.....	24	1:6.4	.....	.....
G. O.	3	.....	7	.....	7	7	7	14 3/4	1:5.6	10	.....

* Ground oats.

† Silage.

DISCUSSION.

Mr. Willing: I would like to ask the cause of the variation of this loss?

Professor Scovell: We found no real cause except in April. During that month there were a great many rains and we left her out with the herd every day. We noticed that when she was out in a cool rain her milk and butter were reduced to some extent.

Mr. Willing: Is there any way you can regulate the danger of milk fever—prevent it?

Professor Scovell: I am sorry to say that we lost a great many cows from the disease. The last two or three cases we saved by using iodide of potassium.

Mr. Willing: Take a helper whose milk tests 5 per cent. When that cow is eight years old, won't her milk be richer?

Professor Scovell: We have had three cows under observation. Our result with the second calf is that they gave as much per cent. of fat, as rich milk, as at any time, provided they are fed well all along. You can take a cow and starve her and she won't give rich milk.

Mr. Willing: Have you had any experience in feeding gluten feed?

Professor Scovell: We use cotton-seed meal. It is cheaper than gluten feed. We get more protein from it and the cows like it fully as well.

Mr. Willing: If there is danger of milk fever, is it well to use purgatives?

Professor Scovell: They give one-half pound of salts just after calving. I don't know whether it is a good thing or not.

Mr. Willing: Is there any danger of getting butterine instead of butter if you feed cotton-seed meal?

Professor Scovell: You can feed as high as four pounds of cotton-seed meal and still keep up the flavor. I know in Texas they feed cotton seed and the melting point of butter is higher and the butter is waxier; not as good a flavor. I am not an expert on butter, but I have noticed a peculiar flavor, due, possibly, to the cotton seed fed. We are selling our butter to people who are very particular about butter, and they have not noticed anything to object to.

Mr. Woods: Do I understand that you are feeding for the largest profit, or feeding for the largest amount of milk?

Professor Scovell: Feeding for the largest amount of milk and butter to be produced from a given amount of food, regardless of profit.

Mr. Woods: Supposing that you had fed two-thirds that amount, would it not have been more profitable?

Professor Scovell: It might have been.

Mr. Woods: I understand that you made a profit of eighty dollars—that you realized two hundred and eighty dollars from that cow.

Professor Scovell: Yes, sir.

Mr. Woods: Eighty dollars above the cost of feeding?

Professor Scovell: Yes, sir.

Mr. Woods: What was the breed of this cow?

Professor Scovell: A Jersey cow. We didn't raise her; we bought her when a calf. I have no doubt that there are cows in every breed that would do the same thing. The question, how to get such cows, is to breed from such cows if you can find them.

Mr. Woods: What price did you pay for that cow when you bought her?

Professor Scovell: We paid two hundred dollars. Secretary Wilson, at one time director of the Iowa Station, thought she was the best cow he ever saw before we knew what she was. If we could get such cows and breed such cows it would be better. Whenever a cow makes two pounds of butter per day she must be well fed.

Mr. Woods: What was the cost of the grain ration per day?

Professor Scovell: I don't know exactly; less than twenty cents.

Mr. Newsom: I would like to ask how near calving time the butter was used from this cow?

Professor Scovell: For four weeks we didn't save the butter at all—we threw it away.

Mr. Woods: Professor, I understood you to say that the quality of the food had nothing to do with the quality of the milk—that the quality of the milk had to be bred in the animal.

Professor Scovell: When a cow is fed a maintenance ration, our experience is that you can not increase her per cent. of butter fat, but you can increase the milk flow.

Mr. Willing: That is an established principle throughout the scientific dairy world?

Professor Scovell: I think so. There is one prominent man that said a cow that gave forty pounds of milk he didn't want. He wanted to feed her down so as to get twenty pounds. His idea was, if she gave forty pounds of milk, there would not be nearly so much fat as if she gave twenty pounds. I think that argument has been controverted.

Mr. Newsom: Is there any relation between the size of the animal and the food necessary to sustain it?

Professor Scovell: I don't think so. I think a small cow will eat more in proportion than a large one.

Mr. Woods: In your experience do you find that this high living shortens the life of the cow to any considerable degree?

Professor Scovell: I don't think it has this cow. I don't think every cow could take that amount of food and live under it. When they produce enough solid matter from that milk to take up the fat they are going to be healthy.

Mr. Woods: Don't you think that if you feed cows a large grain ration and keep them confined in the stable, it is rather against them? They would probably increase in fat, would they not?

Professor Scovell: If she increased in fat I would cut down the ration. If I was compelled to keep her stabled all winter and she increased in fat I would know that I was feeding her to a disadvantage. I don't mean to say that that ought to be the ration for any dairy cow. I will say that twenty-two pounds is not a maximum feed. I have seen records of cows being fed thirty pounds of bran per day; others thirty quarts of oats, thirty quarts of bran, and thirty quarts of corn meal. You see where they were feeding. I have never had a cow that would eat that and live. To make large yields they must have enough food to make the solid matter in that milk or they won't produce their maximum quantity. We are not feeding her this year as much as we did before. The older they get the more fleshy they get.

Mr. Smith: About how heavy a cow was that?

Professor Scovell: About one thousand or one thousand and eighty-seven pounds. She commenced with nine hundred. She had at that time her second calf.

Mr. Willing: What is the danger from a narrow ration?

Professor Scovell: Digestive danger. As some one said this morning, I agree with him fully as to the change of food. Cows need a change. To illustrate: When the cows have been on good bluegrass pasture for some time they will leave that and go to the rye pasture, and in the same way

after they have been on the rye pasture for a time they will go back to the bluegrass.

Mr. Woods: Does this change have any effect on the flavor of the milk?

Professor Scovell: If you change too much. I don't think it does very much. Feeding turnips gives a bad flavor to the milk. Bluegrass gives the milk a splendid flavor. I never did see a cow get tired of corn meal.

Mr. Drischel: In reference to rye as a pasture or for feeding cows, we find in cheese factories that it is not prudent to feed it to them. In fact, we recognize the milk as being rotten. When the milk cans come in and you take the covers off there is a horrid smell which all comes from the rye. It affects the flavor of the butter and cheese, and I wouldn't advise any one to feed rye to dairy cows. I say, we don't need it. Our pastures are green most of the winter and we don't need it.

Mr. Willing: Is there any danger to their health in feeding corn meal?

Professor Scovell: Yes, I think so.

Mr. Willing: Does not the grass run out of phosphate after long pasturing?

Professor Scovell: Our land in Kentucky contains 28 per cent. phosphate, and they say that is the reason our racehorses down there have good strong bones. They have plenty of phosphate for their bones.

Mr. Sykes: I would like to ask a question. Would the proper aeration of the milk after the cows have been turned on green rye eradicate that smell that Mr. Drischel refers to?

Mr. Drischel: It will have some effect. It will help it to a certain extent.

Mr. Sykes: Have you had any experience in feeding the grain—rye?

Mr. Drischel: No, sir.

Mr. Woods: I know that milkmen who pasture rye complain of a rank smell from the milk. They used the aerator and after that it was all right. They said they could smell a rank flavor coming off the milk as they aerated it, and that cured it of the smell.

Professor Scovell: I think it would take a very thorough aeration to do that. Milk don't smell very good any way if the cans have been closed for some time.

Mr. Willing: Do you think a cow could be in a healthy condition having been fed the quantity of feed you fed this cow?

Professor Scovell: We kept this cow stabled all winter, and I know she is in perfect health. If she had not been she could not have given that amount of milk and butter.

(—————): Speaking about the milk smelling after it has been sealed for some time, physicians say to leave the milk can open till the milk is thoroughly cool before sealing it. I have done that and never found that it smells after it has been cooled.

Mr. Willing: The rule is, the wider the ration the less confinement the cow should have.

Professor Scovell: Yes, sir; that is the rule. Cows have individual capacities as to that. In other words, there is no easy way to tell how to feed thirty, forty or fifty cows. You can't feed them all alike and have the same results. You have got to feed them up to a profitable capacity.

Mr. Drischel: I move that the Secretary of this Association be selected as a committee of one to send resolutions to the State Board of Agriculture that we have an able representative of this Association either as superintendent or assistant to represent the people and also the dairy stock.

We all recognize the fact that Purdue has been sending four or five students there to make the exhibit, separating the cream, churning the butter, etc. We recognize the fact that we should be recognized by the State Board of Agriculture and have an able representative to make a proper exhibit at the State Fair.

The above motion was carried.

On motion of Mr. Drischel the convention adjourned sine die.

REPORT TREASURER INDIANA STATE DAIRY ASSOCIATION.

Lafayette, Ind., December 5, 1900.

To the Officers and Members Indiana State Dairy Association:

I respectfully submit the following report:

RECEIPTS.

1899.	
Dec. 7.	By balance on hand last report..... \$139 30
" 7.	By Samuel Schlosser, Hanna, life membership..... 10 00
" 7.	By W. S. Commons, Centreville, contribution to premium and expense fund for which life membership was is- sued 25 00
" 12.	By Boyd & Drischell, contribution for which life mem- berships were issued 25 00
1900.	
Feb. 15.	By Hall Steel Tank Co., adv. in '98 report..... 5 00
Mar. 13.	By J. F. McDonald, Philadelphia, one report..... 50
May 30.	By B. S. Catlin, Buffalo, one report..... 50
Aug. 27.	By Standard Oil Co., one report..... 50
Nov. 17.	By Worcester Salt Co., contribution to premium..... 10 00
	Four membership fees, 1899..... 4 00
	Eighty-seven membership fees, 1900..... 87 00
<hr/>	
Total	..... \$306 80

DISBURSEMENTS.

1899.	
Dec. 7.	To Prof. T. F. Hunt, expense as speaker at Cambridge City \$9 00
" 8.	To H. E. Van Norman, expense as Secretary to annual meeting 7 37
" 30.	To T. A. Shaffer, first premium, creamery butter..... 10 00
" 30.	To B. F. Willmore, second premium, creamery butter... 8 00
" 30.	To T. F. Gallagher, expenses as judge..... 15 30
" 30.	To G. W. Drischel, members' badges 3 50
" 30.	To H. E. Van Norman, Secretary's salary..... 25 00
1900.	
Jan. 16.	To C. B. Benjamin, first premium on dairy butter..... 8 00
" 16.	To Mrs. Chas. Lamont, second premium on dairy butter. 6 00
" 16.	To Boyd & Drischel, first premium on cheese..... 10 00
" 16.	To Wendellbourn, typewriting letters..... 54
" 16.	To O. J. Richardson, second premium on cheese..... 8 00
" 16.	To O. A. Reeser, stenographic report of meeting..... 30 00

Feb. 9.	To H. E. Van Norman, railroad and car fare to Indianapolis	2 85
" 17.	To Home Journal Printing Co., letterheads	2 50
" 23.	To H. E. Van Norman, part of expenses to National Buttermakers' Convention at Lincoln, Neb., February, 1900	25 00
May 5.	To Home Journal Printing Co., 500 leaflets	2 50
Aug. 8.	To H. E. Van Norman, expense to Indianapolis	2 15
Sept. 11.	To W. Jones, telephone to Indianapolis	75
Oct. 26.	To express on reports from Indianapolis	65
" 27.	To Home Journal Printing Co., envelopes for reports	60
Dec. 3.	To Home Journal Printing Co., 1,000 programs	4 00
	To calcium carbides for lantern	50
	To postage for the year	18 77
		<hr/>
		\$200 98
Cash on hand in bank		105 82
		<hr/>
Total		\$306 80

Also, in bank \$8.00 on check in favor of B. F. Willmore, neither check nor voucher for which has been returned.

H. E. VAN NORMAN,
Secretary-Treasurer.

The foregoing report, audited by the undersigned, is found correct.

J. M. KNOX,
SAMUEL SCHLOSSER,
G. W. DRISCHEL.

CREAMERY BUTTER—ENTRIES AND SCORES, HOBART, DECEMBER 5-6, 1900.

(Premium distributed pro rata to all scoring 90 or over.)

No.	NAME OF EXHIBITOR.	ADDRESS.	Flavor	Grain.	Color.	Salt.	Pkg.	Total.
13	Perry L. Johnson.....	Prairie Creek.....	48	25	10	10	5	98
1	Dyer Creamery.....	Dyer.....	47½	25	10	10	5	97½
11	Silas Holloway.....	North Manchester.....	47	24¾	10	10	5	96¾
3	Inter-State Creamery.....	Bemidji, Minn.....	46½	25	10	10	5	96½
5	Deedsville Creamery.....	Deedsville.....	45	25	10	10	5	96
4	Schlusser Bros.....	Bremen.....	44	25	10	10	5	94
6	Hagerstown Creamery.....	Hagerstown.....	44	25	10	10	5	94
8	J. F. Penrod.....	North Liberty.....	43	25	10	10	5	93
10	Schlusser Bros.....	Hanna.....	42	25	10	10	5	91½
12	Mondamira Meadow Creamery.....	Port Wayne.....	41	24½	10	10	5	90½
9	Herbert Newby.....	Spiceland.....	41	24½	9¾	9¾	5	90

DAIRY BUTTER.

2	Mrs. Chas. Lamont.....	Joppe.....	47	25	10	10	5	97
1	C. B. Benjamin.....	Lefroy.....	46	25	10	9¾	5	96¾

CHEESE.

No.	NAME OF EXHIBITOR.	ADDRESS.	Flavor.	Quality.	Texture.	Color.	Salt.	Total.
1	Boyd & Drischel.....	Cambridge City.....	28	30	19	10	10	97

1.	Genesee Salt.	5.	Russina Separator.	9.	Jumbo Separator.	12.	Hanson's Color.
2.	Worcester Salt.	6.	Sharpless Separator.	10.	Wells-Richardson Butter	13.	Buckeye Salt.
3.	Diamond Crystal Salt.	7.	United States Separator.	11.	Alderney Butter Color.	14.	B. and B. Salt.
4.	Delaware Separator.	8.	Reid Separator.			15.	Ashton Salt.

— Not enough color or salt.

APPENDIX.

BUTTER ENTRIES.

Indiana State Fair, September 17 to 21, 1900.

CREAMERY BUTTER—THIRTY-POUND TUB.

<i>No.</i>	<i>Name.</i>	<i>Postoffice.</i>	<i>Score.</i>	<i>Prize.</i>
728.	P. L. Johnson	Prairie Creek	93½	First premium.
728.	P. L. Johnson	Prairie Creek	93.	
1629.	Schlosser Bros	Hanna	92.	
728.	P. L. Johnson	Prairie Creek	91.	

DAIRY BUTTER—FIFTEEN-POUND TUB.

2189.	A. F. Ward	Thorntown	93	First premium.
1449.	Peter Raab	Brightwood	90.	
1458.	Wm. J. Raab	Cumberland.		
246.	Mrs. Jerome Dunlap....	Lafayette.		
255.	Mrs. E. T. Drake	Edinburg.		
1628.	A. B. Steidly	Carlinville, Ill.		
170.	Mrs. Betty Clore	Bargersville.		

FIVE POUNDS IN PRINTS.

105.	C. B. Benjamin	LeRoy	98	First premium.
1449.	Peter Raab	Brightwood	92½	Second premium.
2189.	A. F. Ward	Thorntown	91½	Third premium.
1296.	M. F. Pallshouse	New Augusta	90½.	
246.	Mrs. Jerome Dunlap....	Lafayette.....	90.	
255.	Mrs. E. F. Drake	Edinburg.		

COTTAGE CHEESE.

<i>No.</i>	<i>Name.</i>	<i>Postoffice.</i>	<i>Prize.</i>
2189.	A. F. Ward	Thorntown.....	First premium.
489.	Mrs. Jno. Groseclose....	Indianapolis	Second premium.
413.	Mrs. W. B. Flick	Lawrence	Third premium.
170.	Mrs. Betty Clore	Bargersville.	
246.	Mrs. Jerome Dunlap....	Lafayette.	
245.	Jennie Drake	Beach Grove.	
255.	Mrs. E. T. Drake	Edinburg.	
412.	N. A. Ford	Indianapolis.	
970.	Alice Matthews	Greenwood.	

CHEESE.

CLASS 207.

<i>No.</i>	<i>Name.</i>	<i>Postoffice.</i>	<i>Score.</i>	<i>Prize.</i>
81.	Boyd & Drischel.....	Cambridge City	95.....	First premium.
1644.	Milo A. Stocking	Danville, Ill.....	86.....	Second premium.
564.	.....	.....	86.....	Third premium.
1043.	W. L. McCain.....	Hortonville.....	84.	
1043.	W. L. McCain.....	Hortonville.....	83.	

CLASS 208.

81.	Boyd & Drischel.....	Cambridge City	96.....	First premium.
1043.	W. L. McCain.....	Hortonville.....	93.....	Second premium.

YOUNG AMERICAS—CLASS 209.

81.	Boyd & Drischel.....	Cambridge City	94.....	First premium.
1043.	W. L. McCain.....	Hortonville.....	83.....	Second premium.

AMERICAN DAIRY JOURNALS.

The publishers of these journals will no doubt gladly send copies to those who may apply for them.

American Cheese Maker, Grand Rapids, Mich. Monthly.

American Dairyman, New York City, N. Y. Weekly.

Chicago Produce, Chicago, Ill. Weekly.

Creamery Gazette, Des Moines, Iowa. Monthly.

Creamery Journal, Waterloo, Iowa. Monthly.

Dairy and Creamery, Chicago, Ill. Semi-monthly.

Dairy and Produce Review, San Francisco, Cal. Weekly.

Dairy Age, Beloit, Kansas. Monthly.

Dairy World, Chicago, Ill. Monthly.

Elgin Dairy Report, Elgin, Ill. Weekly.

Hoard's Dairyman, Fort Atkinson, Wis. Weekly.

Jersey Bulletin and Dairy Farmer, Indianapolis, Ind. Weekly.

Milk News, Chicago, Ill. Semi-monthly.

New York Produce Review and American Creamery, New York City. Weekly.

Practical Dairyman, Indianapolis, Ind. Monthly.

St. Paul Dairy Reporter, St. Paul, Minn. Weekly.

Note.—The National oleomargarine and the filled cheese laws are printed in full in the 1897 Report of the Dairy Association. The Indiana pure food law is printed in the 1898 Report of the Dairy Association.

Indiana State Live Stock Sanitary Commission

REPORT OF THE WORK DONE FROM NOVEMBER 1, 1899, TO NOVEMBER 1, 1900.

To His Excellency, Hon. James A. Mount, Governor of Indiana:

The past year has been one of unusual activity upon the part of the Board, and so numerous have been the cases reported over different parts of the State that it has taken all of the time of the State Veterinarian to give them proper attention. In general, the live stock of the State is in good healthy condition, but numerous cases of disease among horses, cattle and sheep break out or are imported into the State, and it is only by prompt attention, thorough investigation and heroic treatment that an epidemic is prevented, or infectious diseases checked before spreading themselves all over the State. The work of a sanitary commission in a State is worth millions of dollars to her live stock interests.

During the past season 47 car loads of Texas cattle were brought into our State from Texas fever districts, and were scattered in several counties. Close watch has been kept of these cattle and proper quarantine methods adopted for the protection of our native cattle.

The State Veterinarian, F. A. Bolser, accompanied by one of the Commissioners, visited the places hereinafter named, where cases were reported of horses, cattle or sheep being suspected of having contagious or infectious diseases.

A detailed report of each case is on file in the Secretary's office. The places visited were as follows, viz.:

1899.

November.—

William Wood, horses, Fountain County.

Sherman Neiverson, mules, Clay County.

December.—

George Day, cattle, Benton County.

John Hoffman, cattle, Greene County.

S. C. Trueblood, cattle, Vigo County.

George Musson, cattle, Noble County.

Joel Kimmel, cattle, Noble County.

Dr. Cox, horses, Randolph County.

1900.

January.—

Stock Yards, sheep, Marion County.
Allen Chastian, horses, Washington County.
Leander Nordyke, horses, White County.
Robert Jordan, horses, Randolph County.
Robert Jordan, horses, Randolph County.
——— Linn, horses, Randolph County.
Allen Chastian, horses, Washington County.
Peden & Son, cattle, Owen County.

February.—

J. C. Huddleson, hogs, Henry County.
Martha Deter, cattle, Franklin County.

March.—

Inter State Yards, sheep, Marion County.
John Harley, horses, Fountain County.
William Wood, horses, Fountain County.

April.—

Inter State Yards, sheep, Marion County.
George W. Ward, horses, Marion County.
John Trulitt, sheep, Delaware County.
Murray Lumpkins, sheep, Delaware County.
J. H. Hoben, cattle, Henry County.

May.—

Dr. Kennel, cattle, Jasper County.
Sylvester Golieph, cattle, Jasper County.
Dawson Bros., cattle, Jasper County.
Ed. Ritter, cattle, Jasper County.
Pixley Ranch, cattle, Jasper County.
Brown Ranch, cattle, Jasper County.
Peter Elbert, horses, St. Joseph County.
Evan Judy, horses, St. Joseph County.
Wm. Robb, cattle, Fountain County.
State Fair Grounds, cattle, Marion County.
William Collins, cattle, Parke County.
Henry Weakley, horses, Jasper County.

June—

Isalah Fletcher, cattle, Posey County.
William Brown, cattle, Lake County.
William Brown, cattle, Lake County.
Dr. Meyers, horses, Allen County.
Frank Fleming, cattle, Spencer County.

July.—

Gale Cole, horses, Fountain County.
Brice Powers, cattle, Delaware County.
Gale Cole, horses, Fountain County.

Henry Sheets, cattle, Delaware County.
 Wm. E. Gibson, cattle, Delaware County.
 Lon Ferry, cattle, Delaware County.
 John Powers, cattle, Delaware County.
 William Osslan, horses, Wells County.
 Guilford Logan, horses, Allen County.
 Guilford Logan, horses, Allen County.
 Frank Carey, cattle, Delaware County.
 Joshua Strange, cattle, Grant County.
 Daniel Studebaker, sheep, Delaware County.
 Charles Buffington, cattle, Delaware County.

August.—

N. A. Long, horses, Carroll County.
 John Nichols, horses, Newton County.
 H. M. Dorroch, mules, Newton County.
 J. W. Bluff, horses, Posey County.

September.—

C. C. Mansfield, cattle, Delaware County.

October.—

Stock Yards, Louisville, Kentucky.
 W. C. Sivard, cattle, Henry County.
 Hayes Bentley, horses, Hancock County.
 Arthur Bartholomew, horses, Marion County.
 W. C. Sivard, cattle, Henry County.
 Charles F. King, cattle, Henry County.
 Stinson & Co., cattle, Henry County.
 W. C. Sivard, cattle, Henry County.
 Livery Stables, Ft. Wayne, Allen County.
 John Nichols, horses, Newton County.
 Chas. Dorroch, horses, Newton County.
 Arthur Wooden, horses, Jasper County.
 John Nichols, horses, Newton County.

Number of visits made in different counties.....	75
Number of horses killed from November 1, 1899, to November 1, 1900.....	28
Total cost to the State.....	\$284 00
Average cost per horse.....	10 51
Total number of cattle killed November 1, 1899, to November 1, 1900	3
Total cost to the State.....	\$20 00
Average cost per head.....	6 66
Total number of horses and mules killed in different counties—	
Allen	2 horses.
Carroll	2 mules.
Clay	2 horses.

Fountain	2 horses.
Marion	1 horse.
Newton	3 horses.
Newton	2 mules.
Posey	2 mules.
St. Joseph	4 horses.
Warren	6 horses.
Wells	1 horse.
Cattle killed in different counties—	
Franklin	1
Henry	1
Spencer	1

The expenses of the Commission for the year ending November 1, 1900, were as follows:

For horses killed	\$284 00
For cattle killed.....	20 00
For attorney's fees.....	50 00
For Commissioner M. S. Claypool, expenses and per diem	528 10
For Commissioner George W. Hall, expenses and per diem	441 40
For State Veterinarian F. A. Bolser, expenses and salary	2,017 05
For Secretary Mortimer Levering, expenses and salary	632 25
For printing and stationery.....	27 20
Total paid out by the State.....	\$4,000 00
Amount of the appropriation.....	4,000 00

On November 1, 1900, the Commission was composed of the following members, viz.:

President M. S. Claypool, Muncie, Delaware County.
 Commissioner George W. Hall, Raleigh, Rush County.
 Commissioner V. K. Officer, Volga, Jefferson County.
 State Veterinarian F. A. Bolser, New Castle, Henry County.
 Secretary Mortimer Levering, Lafayette, Tippecanoe County.

Very respectfully submitted,

M. S. CLAYPOOL,
 GEORGE W. HALL,
 V. K. OFFICER,

Commissioners.

F. A. BOLSER,
 State Veterinarian.
 MORTIMER LEVERING,
 Secretary.

SECOND ANNUAL MEETING
OF THE
Indiana Corn Growers' Association,
HELD IN THE HORTICULTURAL ROOM, STATE HOUSE,
JANUARY 9, 1901.

The President, A. O. Lockridge, of Greencastle, opened the morning session in a brief address, in substance as follows:

Gentlemen of the Indiana Corn Growers' Association—I see by the program this morning that I am down for an address, but I do not care to consume any valuable time in such an effort when I know that we have two excellent papers, followed by interesting discussions, to occupy the morning session. I wish to congratulate the Association on its prosperous growth and for the encouraging interest that has been manifested throughout the year. To us farmers here in Indiana such a movement was entirely new, and we have been, so to speak, on our first legs. The proper culture of corn is a subject that should certainly enlist our liveliest interest, and I have no doubt that we shall all profit by this association. A plant that, according to the President of the Illinois Corn Growers' Association, can produce a cereal that can be manufactured into sixty-two useful articles, should claim our closest attention in discussing its merits and growth.

It is but due to our worthy Secretary, Mr. McMahan, to say that the prosperous condition of our Association is almost wholly by reason of his labors in our behalf, and I thus take pleasure in according to him this meed of praise.

INCREASING THE PROTEIN OR FEEDING QUALITIES OF CORN.

(Extracts from paper read by Charles Buckley, Delphi, Ind., before Indiana Corn Growers' Association.)

In presenting this subject I deem it necessary to mention the different uses for which corn should be grown. I believe there are three distinct varieties of field corn—the hominy, the milling, and the feeding corn. If

we live in a hominy district, and wish to grow corn for that market, we should select the hard, flinty, white corn with a small germ, that they may be as little waste as possible. Or if we wish to grow a milling corn we should select a deep-grained, white corn that is not too hard and flinty. This corn contains a greater per cent. of sugar and starch than that used for hominy, that the meal may not be too harsh. Those of you who have been in the south know that they have a better meal than we have, and a finer, sweeter corn-bread. The next, and I think the most important to us, as Hoosiers, is the feeding corn. This is a somewhat harder corn than the milling, with deep grain and thin hull. The grain should be as nearly square as possible, as we know that there are more feeding qualities in a grain of that shape, than in one that is broad and flat.

I have noticed that the nearer square the grain is the less hard flinty substance it contains, regardless of color. We prefer the yellow, as we think it less liable to be damaged in wet weather. Old farmers say it is stronger, and contains more nourishment than the white varieties, but I can not say, as I have never grown a bushel of white corn. I find enough difficulty in keeping my corn, without mixing with my neighbor's corn, without trying to grow two varieties on one farm. I will tell you how I got my first ideas of corn improvement, or increase of protein. I watched a squirrel eating at my corncrib, and after he was gone I found that he had eaten most from thick grains, while the broad, flat ones had but little taken from them. Later I purposely placed some almost square grains where he could find them, and he left but very small pieces. As the squirrel is an active animal, of good muscle and full of vigor, I concluded that the kind of food that made muscle for him would also make muscle for my stock. Nature's teachings are superior to man's, as she makes no mistakes.

We know that the bodies of animals are composed of tissues, which must be given the proper nourishment to insure vigorous growth if we would reap a financial benefit from them. Protein was originally considered the base of all albuminous substances, but is now known as alkali albumen, and it means first place. It is closely related to protoids, a substance that is present in all animal fluids, and makes up the greater part of animal tissues, and organs subject to crystalization, or cohesion; and cohesion, according to physics, is that form of attraction by which the particles of a body are united, whether like or unlike.

Protein furnishes materials for the lean flesh, blood, skin, muscles, hair, wool and the caseine and albumen of milks, and is of the utmost importance in feeding stuffs. Increasing the protein in corn is something that requires careful study, but after several years of experience, and profiting by both success and failure, I believe I have accomplished my object. We all know that our corn contains too much fat for a balanced ration, and if we, by increasing the protein in this kind of cereals, can add to its already excellent feeding qualities, it is a duty that we owe to ourselves as farmers.

By government analysis the composition of a grain of corn is: Water 10.9, ash 5, protein 10.5, fiber 2.1, nitrogen 69.6, fat 5.4. As I mentioned before, protein furnishes the materials for the lean flesh, blood, skin, muscles, tendons, nerves, hair, hoofs, wool and the caseine and albumen in the milk.

No other ingredient in the make-up of the grain of corn has so important a part to play, so responsible an office to fill as has the protein, and yet I know it can be increased by selecting for seed those grains that are very full near the base, and as nearly square as possible. Two years ago my corn was analyzed and showed two per cent. above government analysis. As I have had no analysis made since that time, I do not know what the gains amount to at the present, although my observations prove to me that my labors have not been in vain.

Let me repeat that every farmer should have a purpose in growing corn, and grow the corn best suited to that purpose. Every stock grower has an ideal animal in his mind, and breeds with that object in view, and the same rule will hold good in corn-growing as in the animal improvement, and I believe that this increase of protein can not be obtained except by the careful selection and proper care of seed corn.

In conclusion I will tell you, brother farmers, how I take care of my seed corn, that you may try it if you wish, as it will cost you nothing to experiment in that line. I am a strong advocate of seed corn being kept in the cellar as I believe that the germ will not become shriveled from excessive heat, consequently the stalk will be stronger, making a more vigorous growth and as a natural result the crop will make a better yield.

Of course you will understand that in selecting your seed you should have an ideal ear in your mind and select ears like or nearly like it as you can find. My ideal ear of corn is uniform in size, tapering slightly, well filled at both ends, with deep grains that are quite full at base. The grains should be as nearly square as can be grown. A grain of this shape requires less material to cover it than a broad, flat one, and contains more feed and less hull. As the hull is the least useful part of the grain, it is essential for us to grow the corn the shape that will produce the most feed.

While I do not wish to criticize fire-dried seed corn, yet we all know that corn is very susceptible to damp weather, and while it will not absorb moisture enough to kill it yet the germ becomes weakened. Our Creator was wiser than we, and placed the oil in the germ to guard against man's carelessness.

CAN WE GROW ONE HUNDRED BUSHELS OF CORN PER ACRE?

CAL HUSSELMAN, AUBURN, IND.

To answer this interrogatory in the affirmative would be very easy and entirely within the limit of possibility and truth. If this is true, then why is the average yield in Indiana so much below this amount?

It will be my aim to point out a few natural and necessary conditions of soil, seed and cultivation to secure this yield.

First, we will note very briefly the nature of the corn plant: It is a sub-tropical plant and must have an abundant supply of heat, air and moisture, as well as an abundant supply of available plant food. It must have an abundant supply of nitrogen, especially in the early period of its growth. It can not grow without this nitrogen, and the most acceptable form of soil nitrogen for the corn plant is that from decaying vegetation. In order to get an abundant supply of available plant food early in the season, it is absolutely necessary to have the mechanical condition of the soil as near perfect as possible. We mean by this that the soil must be well and thoroughly drained to a good depth and an abundant supply of vegetable matter in the form of clover, barnyard manure, etc., incorporated into the soil to a good depth. The deeper this seed-bed is broken and filled with humus the greater the supply of available nitrogen and moisture will be, if the vegetable matter is thoroughly incorporated into the soil and all made firm and fine. Nearly all soils contain sufficient potash and phosphoric acid to make a satisfactory crop of corn if the mechanical conditions are right.

It is manifestly unwise to plant this cereal until settled, warm weather is at hand. The soil must be warm when the seed is planted that the germination may be rapid and vigorous. The seed-bed must be fine, mellow and firm. The depth of planting may vary somewhat, but should not exceed one and one-half inches, and if sufficient moisture is found near the surface, we prefer to plant the grain about one inch deep. At this depth it will receive the greatest amount of heat and will germinate quickly and send a strong plant into the air and sunshine.

The space separating the rows must be carefully studied relative to the soil and variety of corn grown. The larger the corn the greater the distance apart must be. Too thick and too close planting being one great cause of the low yield secured by many farmers. A safe rule for the medium growing varieties is to plant the rows three feet and eight inches apart and have one plant to every fourteen inches of row, but this must be determined according to soil and variety grown, but ample space must be provided for sunshine and air to enter freely into the growing crop.

SEED.

Much has been said and written about seed corn. In our practice two conditions are carefully observed. First, selection. Our aim should be to improve the particular type of corn that we are growing. Therefore select ears of a uniform type. We prefer ears of medium size, with medium cob, long grains, and cob well filled out at both ends. Ears should be only slightly tapered from but to tip, with straight rows of grains. Great care should be given to the selection of such ears from stalks not in close proximity to barren stalks or stalks producing very inferior ears. By exercising great care in this respect, a type may be fixed that will produce few if any barren stalks.

Second, the seed should be selected early from the standing corn that all these points may be carefully noted. It should be carefully housed and allowed to dry all the moisture out of the cob that careful air-drying will accomplish, then be stored in a cool, airy room where the temperature does not reach very much below the freezing point. Very satisfactory results may be obtained by storing in a dry, airy cellar. Seed selected and cared for in this manner will give a much more satisfactory crop than seed selected from the crib at gathering or planting time. An increase of from 25 to 40 per cent. may very easily be secured by the judicious selection and care of the seed.

CULTIVATION.

If the mechanical condition of the soil is as nearly perfect as it can be made then the cultivation of the crop may and should be very shallow and thorough. If the soil lacks humus then it may be advisable to cultivate quite deep with narrow blades while the plant is quite small, but thereafter cultivation must be shallow, not to exceed two inches in depth. The better way is to drain the land thoroughly and fill it with sufficient humus so this deep cultivation will not be necessary. This method will give a much greater supply of available nitrogen and will leave the soil fine and firm and thus retain a greater supply of moisture for the plant and also leave myriads of weed-seeds buried deeply into the soil where they will not germinate.

Cultivation should begin as soon as possible after the seed is planted and continued at frequent intervals until the ears are formed. Three forms of implements or cultivators are best for use on this crop: The weeder first until the plants are three to four inches high, then the two-horse shovel cultivator with six to eight blades in each gang, and last, the one-horse harrow-tooth cultivator with plank-drag attachment for last cultivation. This last implement is very important, as it gives fine, level, surface cultivation so essential to conserve the moisture.

The essential conditions then to growing one hundred bushels of corn per acre are:

1. Thorough preparation of the mechanical condition of the soil.
2. An abundant supply of available plant food, especially nitrogen.
3. Good seed selected with great care and kept in best possible condition.
4. Planting in warm, moist soil giving the plants ample room for sunshine and air.
5. Thorough, frequent, shallow, level and fine cultivation until the ears are fully formed.

THE CULTIVATION OF CORN.

W. B. ANDERSON, OTWELL, IND.

So varied is the soil of our State that an intelligent discussion of the subject of corn culture demands a statement as to the kind of soil upon which the corn is to be grown. In this paper I shall treat the cultivation of corn as it is performed upon the rolling, heavy clay lands so common in southwestern Indiana.

This soil is a rather yellow heavy clay, having very fine grain particles. It is easily damaged when worked too wet, and is a very difficult soil to work when very dry. It is subject to the extremes of wet and dry. The virgin soil is cold, lacking somewhat in humus, yet often containing large quantities of inert, unavailable plant food.

In the cultivation of any crop upon this soil the following should be kept in mind:

1. The addition of vegetable matter to improve the mechanical condition of the seed-bed is of prime importance.
2. If not naturally well drained, a system of underdrainage is necessary.
3. The fertility of the land must be increased.
4. It must receive perfect cultivation.

The addition of humus loosens and mellows the soil, causing it to contain more heat and moisture. When the seed-bed is loosened by the addition of vegetable mold the chemical activity of the soil is increased, and corn, more than any other grain grown upon the farm, needs a soil-laboratory (a seed-bed) that is capable of producing plant food rapidly.

DRAINAGE.

If not naturally well drained, a clay soil must be tile-drained. A well-drained soil affords a deeper root capacity, an increased water content, better soil ventilation, and prevents the evaporation of surplus water from the soil surface, resulting in a warmer soil.

INCREASING THE FERTILITY OF THE LAND

This may be done by the application of barnyard manure, by a judicious system of rotation, and by using commercial fertilizers.

An old colver sod is preferable for corn because it adds humus if one or two crops are plowed under. Furthermore it adds available plant food. If the manure is applied to the growing clover it is better prepared to become food for the future corn crop.

The first requisite in good cultivation is the

PREPARATION OF THE SEED BED.

On a fairly fertile clay soil it is better to plow deep, from eight to ten inches. The breaking should be done when the soil readily falls to pieces from the plow. Care should be taken to turn every particle of soil. If the breaking is properly done, and at the right time, it will make future preparation of the seed-bed comparatively easy. The time for breaking must necessarily fit in with the farm management. We prefer to break after the young clover has well started—about the last of April to May 10. Weather conditions largely determine the method of fitting the broken ground as well as indicate the implements to be used. Heavy rains may pack the ground sufficiently so that the use of the drag and roller will be unnecessary; or the sunshine may so warm the soil that stirring for that purpose can be dispensed with. The soil should be fine and sufficiently compact to bear up a person's weight without sinking, and the use of the harrow, drag and roller must depend upon local conditions. These implements may need immediately to follow the breaking to secure good pulverization and conserve moisture to hasten germination. Often when the planting season is well advanced the greater part of the harrowing and rolling may be done after the corn is planted and before it comes up, the process being continued until the corn joints.

THE SELECTION OF SEED.

The corn selected for seed has much to do with securing a profitable yield. It is well to grow the seed-corn in a specially favored spot, and select from this spot the seed for next year's planting. Uniformity should be considered as well as size and quality of the ear and grain. Usually the large late varieties produce the greatest yields if good rains continue throughout the season. The earlier and smaller varieties, however, have this advantage—they will admit of closer planting, thus increasing the number of ears; and their rapid growth to maturity enables the cultivator to hold from the spring rains the moisture necessary for tasseling and earing. Harvesting, too, can be done much earlier with the small varieties than with the large late kinds. The germinating power of the corn

should be tested before planting. This may be done by planting a few rows very early on a high southern slope, or by using a home-made germinator.

TIME OF PLANTING.

In southern Indiana corn may be planted as early as April 15 and as late as July 4. Planting is greatly influenced by the season, the variety of corn planted, and the temperature of the soil. On the average upland clay, from May 1 to 15, as a rule, is the best time for planting.

CULTIVATION.

Two results are to be accomplished in cultivating corn if a maximum yield is secured, and often they become important factors in the preparation of the seed-bed. They are the destruction of weeds and the conservation of soil moisture. In a rainy season the destruction of weeds is the all-important result to be attained. In a dry season the weed growth is slow and the holding of the moisture in the soil is the object to be gained. The consensus of opinion is in favor of using implements that will give perfect shallow cultivation, i. e., that will remove the top surface and replace it with a loose mulch. The spring-toothed harrow, the eagle-claw attachment, are among the more common implements used. In our clay country we think it a good plan to cultivate about three inches deep while the corn is small. This depth gives a very efficient mulch and is also quite effective in destroying the young weeds that may appear. As the corn grows and surface feeders appear, we cultivate shallow—from one to two inches. However, in a wet season, depth of cultivation has little to do with the yield. The large shovel-plow, the turning-plow or the garden hoe may prove effective implements of culture, because they destroy the weeds. How often should we cultivate? Just as often as the weeds and the dry weather tell us to cultivate. The tiny weeds inform us that a "stitch in time saves nine," and we had better cultivate every time the soil is dry enough or until the weeds are in complete subjection. In the dry season we start with, if possible, a two or a three-inch dust mulch. So long as the surface mulch is comparatively dry and the soil beneath very damp, we consider that the mulch is working perfectly. As soon as the mulch begins to dampen from below, or when it becomes very damp, it is high time to create a new mulch. A shower of rain may make soil but recently worked ready for cultivation within a very short period. In fact as soon as the ground begins to crack after a rain you will check evaporation by making a mulch as soon as you can get on the ground to cultivate. In a rainy season continue cultivation until the weeds are so checked as no longer to interfere with corn growth. In a dry season cultivate as long as the horses and implements can pass through the standing corn without breaking down too many stalks.

CORN SMUT—ITS CAUSE, REMEDY, EFFECT UPON CATTLE.

WILLIAM STUART.

The subject of corn smut is one which has engaged the attention of the scientist as well as the agriculturist for the past century and a half. One might naturally expect that a disease so conspicuous as that of corn smut, affecting as it does a plant that is indigenous to this country, would at least attract the attention of the agriculturist in its native habitat before it would elsewhere, but we do not find this to be the case. A careful study of the literature on corn smut shows that it was recorded by a French botanist named Bonnet as early as 1754. No doubt the disease was observed long ere this, but it was not considered of sufficient importance for publication. The earliest mention of the occurrence of the disease in America is by Schweinitz, who, in his publication of a "Synopsis of the Fungi of North Carolina," in 1822, gives a very accurate description of the fungus.

Bonnet's publication was soon followed by that of other distinguished French botanists, whose observations led them to inquire more definitely into the cause of the disease. It would appear that they were somewhat divided in their opinion as to the actual cause of corn smut. Some were inclined to attribute it to injuries from insects which caused the large swellings, others to a morbid condition of the cell sap which induced an enlargement of the cells of the plant and finally caused them to rupture. Attempts were made by some of the more practical of them to determine what connection the black dust-like substance, now known as the spores or seeds, had with the disease. The experiments which were performed were very similar to those conducted a century and a quarter later by scientists and agriculturists in this country. These consisted in disinfecting the seed, and in planting seed from infected and healthy ears, as well as infecting some with the smut spores. These attempts, like the very much more recent ones in America, were not successful, and so these early investigators were led to conclude that the dust-like substance had nothing to do with the disease. This erroneous impression prevailed until about 1832, when it was recognized as a fungus disease, and the dust-like substance was regarded as the spores or reproductive bodies of the plant. From 1832 to 1895 it was supposed that infection took place when the germinating plant was very young, as in the wheat and oats, hence all remedies employed for its prevention consisted in some form of seed treatment. It was not until 1895, when Dr. Oscar Brefeld, a noted German investigator, published a complete account of the results of a long and careful study of the disease, that its full history was known. Brefeld succeeded in showing that all young active growing parts of the plant were susceptible to infection.

CAUSE OF CORN SMUT.

The disease known as corn smut is due to a parasite fungus plant belonging to a class of plant parasites known as Smuts. Its scientific name is *Ustilago Zeae* (Beckm.) Ung. The spores or seeds of this class of fungi are usually produced in the heads of the plants as in wheat and oats. In the corn plant, however, they are produced on any portion of the plant. In the smut of wheat and oats the infection takes place in the germinating seedling, while in the corn plant it may occur during almost the entire period of its growth.

INFECTION.

Under suitable conditions of heat and moisture the smut spores germinate, pushing out a long germ tube which soon begins to branch by a sort of budding process. This branching occurs with more or less rapidity according to the nutrient they obtain. In a short time from the tips of these branches secondary spores or conidia are formed. If conditions are favorable this process takes place in from eighteen to thirty-six hours after the spores are placed in water or moist air. Two forms of conidia are recognized—those that are formed beneath the surface of a liquid or solid media, and those that are formed on branches growing in the moist air. The former are termed water conidia and the latter air conidia. Either form of spores are capable of germinating and producing other conidia. Brefeld, in his artificial infection experiments, was highly successful when he sprayed corn plants with culture solutions containing these air conidia. It is supposed that these air conidia being detached from the parent plant are blown about by currents of air and thus find lodgement on the corn plant. If the spore lodges on young active growing portions of the plant, and has sufficient moisture to enable it to germinate, a long germ tube is pushed out which if it gains access to the interior of the tissues through a breathing organ or an abrasion, infection of the plant at that point is almost sure to follow. In Brefeld's experiments it was shown that the fungus did not spread to different parts of the plant, but that it was purely local in its action; the pustules being formed at or near the point of infection. Hence when different parts of a plant shows pustules it means that the infections have taken place at each of these points. Well developed pustules were obtained by artificial infections in from two to three weeks.

Corn smut spores were found by the writer to be capable of germination as soon as they were mature. Hence it follows that spores from the earlier infections are capable of producing fresh infections in the same crop. The smut spores have been known to remain viable for several years.

REMEDY.

Owing to the method by which plants are naturally infected in the field, and the long period of growth in which they are susceptible to infection, no satisfactory remedy can be recommended. Experiments performed by the writer at the Indiana Experiment Station proved that the disease can be largely decreased by spraying the plants, at frequent intervals during the growing season, with Bordeaux mixture. This method, however, is not advocated because it is not considered practicable. Our only resource in combating corn smut lies in the employment of preventive measures. The most efficient of these now known is that of the removal and destruction of the smut pustules as soon as they appear. An active boy with a sack slung over his shoulder in which to carry the pustules could go over several acres of corn in a day. This precaution if followed closely, at least during the early portion of the season, say June, July and a portion of August, would greatly lessen the disease.

EFFECT UPON CATTLE.

Numerous instances have been recorded from time to time in our agricultural journals of the loss of cattle from eating corn smut, but so far as the writer is aware, but one authentic account is to be found where the death of an animal could be definitely ascribed to eating corn smut. The instance referred to occurred at the Wisconsin Experiment Station in the fall of 1880. A brief account of this case is as follows. By direction of Professor Henry, two cows were fed corn smut along with other food for several days. One cow was given six ounces mixed with bran in two daily feeds, this amount being gradually increased until at the end of eleven days the cow was receiving thirty-two ounces per day. No evil effects upon the cow were noted. The second cow was fed in the same way, and at the end of the thirteenth day was receiving sixty-four ounces, when the experiment was terminated by the sudden death of the cow. Although similar experiments have been conducted elsewhere, notably by the U. S. Department of Agriculture and the Michigan Agricultural Experiment Station, in which a much larger amount of smut was fed to cows, steers and heifers, no ill results were noted. From these and other experiments it is safe to say that corn smut is not injurious to farm animals, at least in any amount likely to be consumed in the field. Deaths of cattle running in stalk fields are due to other causes than that of corn smut.

PHYSIOLOGICAL ACTION OF CORN SMUT EXTRACT.

While it is true that ordinarily no ill effect is produced by corn smut when eaten in large quantities by stock, it seems to contain some principle which may be extracted by alcohol that does produce a marked physiological action when administered subcutaneously. So far our observations

have been confined to that of the horse. This portion of the work, with the exception of the preparation of the extract, was performed by Dr. R. A. Craig, of the Veterinary Department. The extract was so prepared that each cc. represented one gram of the smut spores. Dr. Craig found that when doses of from 25 to 45 cc. were administered to a horse subcutaneously a marked reaction was soon obtained. The horse would cease eating in from fifteen to twenty minutes, become restless, the pulse and respiration were quickened and the peristaltic movements were increased, being soon followed by a moist evacuation of faeces. In the case of the lesser dose the effect soon passed away, but in the larger one of 45 cc., it lasted for twenty-four hours.

For fuller details concerning this experiment the reader is referred to the Thirteenth Annual Report of the Indiana Experiment Station, p. 30-31.

To sum up the subject then, we have a disease capable of infecting the corn plant during almost its entire growing period. Preventive measures are the only feasible ones to be adopted in controlling the disease. No ill effects are likely to result to stock from eating the smut pustules.

PROCEEDINGS
OF THE
Indiana Horticultural Society.

MIDSUMMER MEETING AT PLAINFIELD,

AUGUST 16 AND 17, 1900.

The summer meeting of the Indiana Horticultural Society was held at Plainfield on Thursday and Friday, August 16 and 17, 1900.

The meeting was opened at 10 a. m., with prayer by Rev. David Hadley. The address of welcome was delivered by Hon. James M. Barlow, of Plainfield, who said:

Mr. Chairman and Visitors—I welcome you this morning into the county of Hendricks—one, we believe, of the very best counties in the great State of Indiana. Situated as we are, in the central part of the State, near the metropolis, traversed with good watercourses, diversified by our undulating lands, we have soils adapted to all grains, vegetables and fruits that do well in this climate. The county of Hendricks, or such part of it as we now occupy, is one known for many years as a fertile, productive part of the country. It has been said that in the early settlement of Indiana, particularly by the Quakers, whose hospitality we now enjoy, that that class of citizenship has been equal to and perhaps greater in the production of all the fruits and vegetables than any other in the community. It was Dr. Furness, of this county, who once had a nursery here and was known far and wide for the honesty of the stock he put on the market and shipped to different points. We had before that the Sickeron nursery, possibly seventy years ago, located four and one-half or five miles north of here. Trees from that nursery still stand. When I was a small boy, I remember fruit that grew from those trees. There is no question that they were far superior to what we now raise, possibly on account of the newness of the country and less pests and insects and other disturbances to fruit growth. We had other nurseries that also had wide reputations. We have another nursery in the western part of

the county which has put out a good many trees, and at present your President is known throughout all the great States of our nation where fruits will grow well. Hence we feel that when we meet you we greet you as friends. You who are here to-day have left your homes and with you have brought telling evidences, indisputable, that your work is the business of horticulture. That speaks more than tongue can speak. That is the real thing, hence you are not strangers in Hendricks County. Hendricks County has been noted for her good stock. A number of men here are known far and wide for bringing fine stock to market. The horse, cattle, hog and sheep interests have not been left alone. It was looked after and well looked after by the people of this county. Our churches have been well cared for. The little log church has given way to large brick mansions. The little dirt-floored schoolhouse has given way to others which are among the finest in the State. All of which we are proud of. I say to you in behalf of the citizens of this town and county that I welcome you into our midst, and whatever is ours is yours to enjoy while you remain with us. I thank you for your visit. I am glad to meet you face to face. Some I have seen before and others not. I say again that the town is yours. Make yourselves at home. Remember us when you return home.

RESPONSE TO WELCOME.

SYLVESTER JOHNSON, IRVINGTON.

Mr. Chairman—I will say in behalf of the Society that we accept this welcome and kindly greeting in the spirit in which it was intended by the speaker, and had I been a member of the Legislature, as was the one who has just taken his seat, I could probably have expressed the feelings of the Society better, but, never having had this experience, I feel at a loss to undertake to do it justice. But personally I want to say a word or two. There is one thing and only one thing that I would disagree with the speaker on. That is that the fruit now is not as good as when he was a boy. I think I can account for that feeling he exhibits on the ground that he was a boy then and his appetite is not so strong now as then. I have received great good from this Society, and I hope we may do this community some good. I know something of this county, and second every word he has said. I have a warm feeling for the people of this county because it is so much like Wayne County, where I spent most of my boyhood. I assure you that the members of this Society feel gratified for your cordial welcome, and I am sure we will feel at home with your citizens, and we hope they will attend our meetings and be benefited by us.

We think we who have been in this work for so many years can be of benefit to those who have not lived so long as we have. In the meantime we ask the citizens to participate in our discussions, and we want to do you all the good we can, and we want you to do us what good you want to do.

The first paper was then read:

HORTICULTURE—ITS RELATION TO THE COUNTRY HOMES.

ADRIAN A. PARSONS, PLAINFIELD.

When I was informed that I had been assigned a subject, and was expected to prepare a paper for the State Horticultural Society meeting, the first thought that came to me was, What does the committee expect of me? The answer was worked out to my satisfaction by recalling a visit one of the committee made to our place a few weeks before. He found us down in a small field not far from the house planting beans, with a hoe, just an ordinary hoe, and the old-fashioned white army bean.

The girl I left behind me was dropping and I did the covering—and, by the way, that being left behind was a long time ago, and is all I have to boast of, never having been able to repeat it. I was also at work on a problem. You see I thought I knew more than Professors Henry, Latta and all the rest that didn't agree with me, and had tried to get four weeks more into the season by tacking them on the front end. I had planted what they believed a tender plant too soon.

My pride was assuming Chinese proportions after the first frost, which did no harm at all, but in ten days another came, with the union brand, that got in its work in fine shape. We were filling up the vacancies with beans, and the problem was, why should three or four be taken and one left?

I was very near a solution when some one called, "Hello! What's this?" Looking up, I saw him holding a plant in his hand. I gave him the name I knew it by. "Yes," says he, "a forage plant. And what's this?" "That," I said, "is another forage plant we call rape." "Rape?" he said, and began pulling the leaves and filling his mouth with them. And from force of habit I took some prepared fodder from my pocket, filled my mouth, and almost immediately we were as congenial as brothers.

He said: "Aren't you lonesome? You're half a mile back from the road, and have no free mail delivery, and no telephone."

I told him we were not lonesome, only sometimes when we had company, and by being back from the road the temptation was removed by

that distance to meddle with other peoples business, and we didn't want a telephone because just now talk is the cheapest thing on the market. I have given enough of the conversation to show why I was put on for a paper.

The committee wanted something from away back. But I will not attempt a logical discussion of the subject assigned, because I am desirous of keeping the reputation I have been so long in making—that is, not to undertake anything when the chances of success are all against me.

The people that live in the country may be properly divided into three classes: The agriculturist, the horticulturist, and the farmer.

It appears from authentic history that horticulture is the oldest institution, but had a very severe setback that kept it in the background for a few thousand years. To explain all that led to this would take too much of our time, but it is generally believed that the woman had much to do with it. I don't agree with all of this theory, but if she did she should have the full measure of honor due her for restoring it.

It appears from the same history that Tubal Cain gave the first great impulse to agriculture by making the first plowshare. This satisfied the people, and for thousands of years the son carefully followed in the footsteps of the grandfather. Under this system food was obtained, strong constitutions and muscular bodies were built up, but little mental effort was required. Nature's full storehouse compensated and balanced the condition. But as time and a continual draft had diminished these accumulated stores, a greater effort was necessary on the part of the laborer to produce the same results; this effort also added a quickening germ to the mind, and more thought began to be mixed with the labor, and the garden was almost invariably the first thing to feel the touch of inspiration. Here the woman comes in and regains all her lost prestige, for that was for centuries her unquestioned domain, the husband seldom sharpening the hoe with which the work was done.

From the better cultivated gardens grew forms of beauty that permeated the home and furnished a greater stimulus to mental activity. This, like added pinions, was constantly presenting new views, which, being materialized, bound the thoughts more closely to the home and built up and strengthened the desire for the ideal. This creative power that thought controls and is especially the heritage of the ruralist.

The greatest satisfaction in life is to be filled with love, and the strongest and best love is the outgrowth of labor.

The ruralist is nearest the divine heart because he is nearest a co-worker, and can say more truthfully that the results of his labor are very good. He earns his rest, and in the contemplation of the beauty he has created lies his greatest reward.

To make the thought more clear, contrast the rural home with the city. The city home is a beautiful picture, bought with money. The aspirations to get more money to buy more pleasure. The result, a hunger-

ing after that deep love that a knowledge of having employed the talents given to the accomplishment of the greatest good possible, in harmony with nature and nature's God, always brings.

The rural home is materialized labor and thought, which is a touch of divinity. The aspirations, to think deeper and strive harder to get closer to nature's heart, to revel in her secrets. The results, a feeling of kinship to everything. Having watched the growth and development of every form of beauty that surrounds him, they are the children of his love and care.

All the thought and labor that has brought him to this point has developed him into a farmer. The idea conveyed by the word agriculture is cultivating the fields, and of horticulture the gardens and orchards. But the farmer has combined all the economies of nature, and is working them in harmony, each contributing to the support of the other.

As nature's laws are sometimes varied by a sport—that is, something appears without seeming to have followed the rule that like begets like—so among farmers we have an occasional specimen that seems to confine all his energies in one direction, the development or production of a single article. We call them specialists, and the greatest results in producing individual specimens of high merit are obtained by this concentration of all the faculties in one line, but few of this class are needed, and it appears as a wise provision that nearly all specialists are bachelors.

Duthy, the greatest living Shorthorn breeder, is an old bachelor, and says that a man that has great love for stock has no love for women. Their numbers are decreasing. They used to be common among the old agriculturists who did just as father did and compelled the son to do likewise. The cause has suffered great loss by having the brightest boys driven from the farm by the ignorance of the father. Men who have never been able to grow two ears of corn exactly alike have thought to change the individuality of the child and shape a course for him. The fathers are working under a stronger light now, and those mistakes of the past are not likely to be repeated.

The power of the nation is cradled in rural homes, and the nearer they approach the ideal from nature's standpoint the clearer and loftier will be the national thought.

DISCUSSION.

Discussion led by Amos Garretson, Pendleton.

Mr. Garretson: Ladies and Gentlemen—I also think that the committee made a mistake in their choice of one to respond to this paper. We started out two weeks ago to attend this meeting and came by the way of Brown County. We also spent a very pleasant day at Bloomington. We find the rural homes are closely related to the divine heart. When

we landed in this town the very first person we met was Mr. Morgan, and he turned everything over to us. We made ourselves at home. We think the rural home is the best home. I am a poor man to talk and will only open the subject and let some else do the discussing.

Mrs. Stevens: Perhaps I am one of the most enthusiastic women horticulturists in the State, and I would like to say a word. I have learned to shrink at the word horticulturist, because almost every time the men refer to Mother Eve, and of course that is a tender spot with part of us. But for those who think as I do, I want to drop this, from Elizabeth Cady Stanton: Some one had said to her that woman has never received the penalty she deserved for offering the apple to Adam. She justified her by saying that Satan did not take an apple from a fine tree, but he took it from the tree of knowledge, and she thought Eve was very wise to take it, and was still wiser to offer it to her husband. I want you to feel that we did not do such a bad job after all.

Mr. Barlow: I have been a rather close observer as to horticulture and its relation to country homes, and whether we are doing our duty as parents or not. There has been a great desire among the children throughout our country in the rural districts to get away from the country home and go to town. In our own town we have a number of citizens who have good farms near by, but they have gone to town with the children. If they do not go to stay all the time, they stay part of the time. It is my opinion that the country is not only the healthiest, but much the best place to raise your family. I think much depends upon the manner in which we make our country homes. We are now making them more pleasant. We have more books and papers; we have rural deliveries and we can get our papers every day. It makes home in the country equal to or better than in town. There is not a boy who does not like the taste of fruit from the tree better than from the grocery store. It is better. The melons are better. Pears are better. Grapes are better. Why? Because they are more perfect. Culture of these things is tending to bring the children back to the country. My prediction is that in twenty years from now people in town will want to get to the country, and I believe that the more we try to put such fruit on our farms and let our children understand it is not drudgery, the more they will want to stay there. We do not need to labor so much. We should have more recreation. More time to look after these things. If we make our rural homes more pleasant the children will want to stay there.

Mr. Davis: After hearing the older horticulturists speak, I would like to add a word or two from the younger side. I would like to say that the country home is what the occupants make it. The man is to a great extent what he makes himself. I mean that if he deals in fruits and flowers and the like, he will be a better man. If he is a hog raiser and keeps that

work up, he will become more like a hog. I do not mean to say that no stock should be raised, but it is a fact that horticulturists are a better class of people because they are closer to God, as they cultivate those things that bring them nearer to God.

In our farmers' institute there was a question: "Which is more profitable, our boys and girls or our stock?" I do not blame men and women for leaving the farm when they see the homes with no flowers, no fruit or anything attractive. Keep them at home by raising good fruit and nice flowers and living close to nature's God.

Mr. Ratliff: There has been a wonderful change in the occupants of the country homes in recent years. In passing through different sections of the country I find the majority of the farmers are young people. The older people have a right to leave the farm. Their duty has been performed. Their years of activity are past and I think they require some rest, and in doing this their children should take their places. If there is anything conducive to good health and prosperity, it is the country home. I heard a paper not long since in reference to the number of young people that are leaving the farms and going to the city. The reader said that the way to cause young people to leave the farm was to give them an education. They did not know that I had been to an agricultural school. I could not refrain from answering him, and I could state that there was one consolation in a good education, and that was that it is always at hand. One of the professors at Earlham says that no one until he gets to be forty years old should refrain from trying to learn something. If children and young people fail to get an education it is a great detriment. Farmers will soon learn that it is a benefit to secure one for themselves and for their posterity. In passing through the country you will see that the farm homes are being repaired. Now trees are being placed around the homes. Orchards are being planted, and as a result more contentment is being found at home. This should be encouraged.

Mr. D. B. Johnson: I have been thinking of the old home where I was born and reared and of the abundance of fruit we had. That is the first thing I think of when I think of the old farm. It has come back to me of late years and I am trying to reproduce the abundance of fruit, and I believe when we get a home and look over it we place a great deal of value on the horticultural side of the farm. A farm with all this is considered a good home. Children seem to like the farm if the horticultural side is looked after. I think if I should live very long I will be quite a horticulturist.

Mrs. DeVilbiss: If growing hogs would make us like a hog, would growing trees make us like trees? The subject of horticulture elevates and causes contentment in the home, and it also is a good thing to make

money out of. When we moved on our farm we were laughed at, and people said if we wanted to raise bricks we would have to fertilize, but we kept on, and I think we will raise the golden brick after awhile.

Mr. Henry: If a person will follow the history of the farm for the past thirty or forty years he will see the reason why horticulture has been neglected since 1860. Before that, a person could plant a tree and reap the fruit without much trouble, and our forefathers did that. That is the reason we had plenty of fruit. After the war began and people began to look more at the money side, they neglected the horticultural part and they were looking more after dollar wheat and getting money directly out of the soil. They neglected the horticultural side. Perhaps the farmers concluded they would make more money out of the soil and buy their fruit. Perhaps it is a benefit to the farmer as well as to the community that there is not so much money in wheat as there used to be. There are a great many farmers to-day who are planting fruit simply because they have not the money to buy it. Perhaps that is a benefit to the farmer and his family. I think that is the reason why horticulture has been neglected for the last twenty-five years on the farm. I know there is a revival of it to-day. I know there are more farmers engaged in beautifying their homes than there were ten years ago, and I believe it will increase right along.

Mr. Hael: About seventeen years ago, living in the city and having a family growing up, I considered it almost a necessity to go out where I could have better surroundings, so I moved out three miles on the end of a field without a tree or stump on it. I tried to build a home there, having a good paper, "The Indiana Farmer," to help me, and I succeeded in building quite a nice country home, and I have not been sorry at any time that I have such a place.

Mr. Flanners: I just want to say what is perhaps unnecessary, but I want to put in a little word for a little more beauty about the country home. In a funny paragraph in a paper the other day, some lady, in speaking of a school, spoke of a girl who attended the school by the name of Bridget. At the end of the first year the name had turned into Bridgetta. The second year it was Etta. The third year it was Margaretta, and the fourth year she graduated as a full grown Marguerite. There was something pathetic about it. There was love for the beautiful. In her homely and ignorant way she was trying to develop the beautiful. I once went to the room of a colored woman. She had gathered a few fancy photographs and had added some small theatrical posters, and then gathered advertisements from the grocery, and then she took off the papers from fruit cans, and all her walls were solid with pictures. In her rude way she was reaching after the beautiful. We do not want to forget that in our country homes. Any who have gone to remote regions, beyond

the reach of grass, when you get back to the land of grass, you wanted to get down on your knees and kiss the sod. There is nothing more beautiful. We do so many things ignorantly. There was a friend of mine in Marion County who was worth about \$25,000 and was a fine specimen of a farmer and neighbor. He was a good man and a good neighbor in every way. I was at his house one day. He was about seventy and his wife about fifty-five years old. The house was on a rise of ground and they had some fine springs. The springs were at least 100 yards from the house and down the hill. It never seemed to occur to him that he ought to have a well near the house so his wife would not have to carry the water so far. That is only a little thing. Let the man who is able have a windmill. We ignore the things that God gives us to add to the beauty and comfort.

Professor Latta: There is one thing I would like to say, and yet I do not want to trespass on the theme for the afternoon. While our homes, as a rule, are not lacking now in horticultural features, they are lacking in such a grouping of these things as will make a tasteful home. There are horticultural misfits in the geography of our planting. I saw a home in northern Indiana in a well-to-do neighborhood, which had a garden directly in front of the house. That appeared to be a horticultural misfit. If you will only look at the farm homes as you go through the country you will find a few of these misfits.

Mr. Little: I think we make a great mistake sometimes by building our houses in too small a place and not giving room enough for trees. I believe in living back from the road and placing trees around. There is nothing more beautiful than trees. I doubt if you can find any more beautiful home than that of John Morgan, on this road. We have a great variety of beautiful trees and I think there is a mistake often made in building too near the road.

The following committees were then appointed by the President:

Committee on Exhibits—Mr. E. Y. Teas, Mr. Henry, Mrs. Stevens.

Committee on Resolutions—J. G. Kingsbury, Mrs. J. Troop, Mrs. Naomi DeVilbiss.

Mr. Kingsbury: I want to say something about spraying at every meeting of the State Horticultural Society that I attend. I think without the profession of sprayers, we will never have the perfect fruit that Mr. Barlow enjoyed when he was a boy. I think the fruit was better then. Fruit could then be eaten without the danger of running your teeth into a fat worm. Now you can hardly eat an apple without cutting around the place where a worm has been. This society, it seems to me, should recommend young men in every neighborhood to fit themselves, mentally and

mechanically, for the business of spraying. They should learn what is necessary and should prepare themselves with the very best materials and make it a business. Then we could expect good fruit, and unless we do, it is in vain. We can not have perfect apples, or plums, or even cherries unless we spray the trees. Farmers are too much occupied with other matters at the time when insects are most prevalent, and the result is they go without spraying and the fruit is imperfect. I want this Society to resolve that this is a work that is worthy of being made a profession, and we believe it will pay a person in each neighborhood to fit himself for it.

After the noon recess the following paper was read on

AESTHETICS OF HORTICULTURE.

MRS. DR. JOHN RAGAN, PLAINFIELD.

Aesthetics pertain to that which is beautiful and pleasing to the eye, or which in any way appeals to the finer sensibilities. It may be characteristic of an object within itself, or its arrangement with reference to something else.

Horticulture, in its broadest sense, includes the cultivation of flowers, fruits and vegetables.

In thinking about this subject, it has seemed to me to embody the idea of cultivating not so much that which is beautiful but rather the cultivation of all things in the most attractive ways. Hence, to combine the two, aesthetics of horticulture means the cultivation of flowers, fruits and vegetables in the way most attractive in appearance.

It has been said that the first query of an American with reference to any enterprise is, "Will it pay?" While this is an essential element to success and in itself is very commendable, yet there are different ways in which to consider the question of "Will it pay?"

In this busy old world, with its tired people, there are many things that in themselves count for nothing so far as increasing one's bank account, or enlarging the bulkiness of the pocketbook is concerned; yet I would ask, Will it pay to deprive ourselves of the many things which bring enjoyment and pleasure to the human heart, simply because "there's no money in it?" If we consider the elevating and refining influences of these things they count for much. Therefore, when a plot of ground is to be put under cultivation, if it be necessary, as it is with so many people, to realize in a pecuniary way all that is possible from it, one need not crowd everything upon it, regardless of plan. Neither should

he lose sight of the fact that the intrinsic value need not be lessened by giving some attention to artistic arrangement. For instance, if you are planting in rows, make them straight.

I remember when a child of riding with my father one bright June day by the cornfield of a neighbor, in which the hills of corn had been planted so accurately that we could trace the straight rows in seven different directions across the field. While on the opposite side of the road was another field of corn in which not one straight row could be seen. This, though an example of "aesthetics in agriculture," illustrates my meaning. It made a lasting impression on my memory, for never since then have I seen a field of corn without considering the manner in which it was planted.

Again, if the soil is productive alike throughout a given plot of ground, the value of the yield would be the same, and the pleasure in appearance would be oftentimes much greater, if more thought and care were given in planting, so that the growing plants would produce the best general effect.

This is true in a garden where vegetables alone are grown, but much more so in a garden where flowers, too, abound.

For instance, imagine a flower garden where no attention is paid to the quality of the foliage, the height of the plants, or the color of the blossom. Where flowers wearing decided colors—as yellow, red and blue—are put together in such close proximity as to detract very materially from the beauty of each, though each within itself may be a thing of beauty. Whereas, if plants bearing flowers of softer tints had been intermingled, not only would each color be more pleasing, but the effect viewed as a whole would be much more artistic.

Though flowers may occupy a very limited space in the garden, they add much to its attractiveness. Perhaps all of us can recall the gardens of some homes—well-kept walks, bordered on either side with flowers, and the vegetables distributed in the most desirable places for them; and perhaps, too, we can remember the great bouquets of flowers which the thoughtful hostess would cull for us to carry away. Such gardens combine beauty and utility in a very practical way.

Let us consider for a moment the description of the first garden of which history gives us any record. It was planned and planted by a master hand, one who did all things well, because He was all-wise. This gardener understood the blending of the countless tints so that no combination of His was ever inharmonious; and in His garden was combined the beautiful and the useful. Hear the description: "And the Lord God planted a garden eastward in Eden; and out of the ground made the Lord God to grow every tree that is pleasant to the sight, and good for food. The tree of life also in the midst of the garden, and the tree of knowledge of good and of evil. And a river went out of Eden to water the garden. And the Lord God took the man and put him into the garden of Eden, to dress it and to keep it."

In this description you see special mention is made, first of all, that "it was pleasant to the sight." Considering that the same master mind which fashioned that garden furnishes to-day countless varieties of plants, shrubs, and trees, from which to select, and that the soil is already prepared to give proper nourishment to each according to its need—the green for the leaf, the red for the rose, the white for the lily, and many colors in one flower if such is desired—all that remains for us to do is the arranging of the different things. Realizing this truth, can we better show our appreciation of the beautiful things which nature gives us than by trying to place them in a way which is "pleasant to the sight?"

DISCUSSION.

Discussion led by J. G. Kingsbury: The pleasant things in horticulture are referred to by the title. From seed-time to harvest there is a succession of pleasures to the lover of this art. To him the straight seeded furrow drawn through the smooth, mellow earth is a source of enjoyment. To see the plants pushing through their earthy covering is a greater pleasure; a still greater one is to help make them grow by the use of a rake and hoe. Yes, even work, in the garden among the vegetables and flowers, the shrubs and vines, cultivating and pruning, is a delight to the man or woman who has not been weaned away from nature's heart by trade, politics, or the follies of fashion and modern artificial life.

We have in mind a friend who is so fond of working among his fruits and vines that he once complained at his strawberries for continuing so long in fruiting, for he wanted to get into the vines and clean them out. He couldn't bear to see them getting weedy.

Propagating plants and producing new varieties is a pleasure akin to that of creating. With what eager interest the amateur or professional pomologist or florist watches the result of his efforts to produce something new and superior, in fruit or flower, and what a keen satisfaction he enjoys when he has succeeded, as did the venerable originator of the Concord grape, Dr. Bull, or our own Granville Cowing, of Muncie, with his delicious Brunette strawberry, in adding something to the pleasure of their fellowmen. The same may be said of the originators of our new and popular carnations, chrysanthemums, pansies, the Rambler and other roses, among the flowers.

It is chief among the delights of horticulture that man is thus permitted to be a co-worker with the divine gardener in multiplying new forms of beauty in the floral world.

Rightly regarded, the effect of horticulture is to elevate the soul to loving communion with the author of all that is good and perfect. The poet recognizes this thought when he praises the hand that formed those

lovely creations. "My Father made them all," he sings. From childhood we remember the words of a pious old gentleman as he bowed over the flowers in his well-kept garden and smelled their fragrance, saying: "My Father is so kind to have made all this beauty and fragrance for me to enjoy."

Following was a paper on

TREES AND THEIR USE IN RURAL EMBELLISHMENT.

MRS. W. W. STEVENS, SALEM.

One of the principal objects and aims of the enthusiastic horticulturist's life is to be continually adding something to the attractiveness of the home as the years go by. As a rule too little attention is paid to the embellishment of the rural home. The houses and barns may be conveniently arranged and of imposing structure, but on account of the lack of pleasant surroundings they present an uninviting appearance, and do not give comfort and ease to the dwellers therein. What a pleasure it is to have a home with surroundings so inviting and complete that they are not only a continual source of pleasure to the occupants thereof, but continually elicit remarks of commendation from any visitor and passer-by as well. We all enjoy doing anything that seems to meet with public approval.

Men and trees have always been inseparable companions. We might exist without trees, it is true, but, constituted as man is, and established as trees and their functions and properties are, it is plain that the present exquisite order and harmony of things in regard to man's welfare are most intimately and inseparably identified with trees.

If we would consider man and his privileges, the amenities and enjoyments that enrich life, the comforts and ornaments of his home, we can not possibly do so, if we would give all things their fair place, without keeping trees constantly in mind. From the time when all trees pleasant to the sight were set in the first garden down to the building and adornment of the newest country home, have trees given picturesqueness to the landscape, surrounded man's home with beauty, and been to him everywhere objects of attention, companionship and love. In the landscape trees are indispensable to that high and fine quality of enjoyment which we term picturesqueness. We may look out upon a rocky mountain and pronounce it grand and sublime, but we have little sympathy with its somewhat forbidding grandeur. Infinite reaches of rolling prairie, the soil fertile as can be and covered for miles and miles with rich fields of waving grain, may give one an idea of agricultural wealth, but in the

absence of trees neither view could be called beautiful or picturesque. Trees clothe the mountain sides with loveliness, they break up the outlines of view and give variety of color, movement and shadow; they touch the imagination with an agreeable sense of fruitfulness, or, if they are forest trees, with the idea of nobility and wealth. Indeed, trees are to the landscape what living and moving people are to the town—an element that may be dispensed with, it is true, but if so must be done at the expense of the finest and most impressive influences. "The truth is," says Hamerton, "that a solitude is not so solitary if there is a tree in it, and if there is a group of trees we feel it to be almost peopled." Indeed, I think it will be found true in the experience of most of us, that those scenes which come home most warmly to our sympathies, and that seem to have a perennial hold upon our hearts, are those that are enriched by the abundance of trees, shrubs and flowers.

For the past 100 years we people of Indiana have waged a war of extermination against our grand old forests. Our forefathers, in opening up their farms, wanted not a tree to be left standing about cabin or hovel—there were trees enough everywhere, and of what good were they except for rails, fuel and sawlogs? Then only the very choicest specimens were utilized. Down came all the rest to be burned in huge heaps, for the early settler seemed in a hurry to rid the ground of every vestige of nature's most beautiful creation. But we are glad to have lived to a day when a higher and more rational public sentiment prevails among our people—when trees are regarded as objects of beauty, deserving our affection and care—when to cut down a beautiful tree is felt to be a kind of slaughter, and to protect them is the sign of a tender and merciful disposition.

In a country of so varied natural beauty as that favored portion of the great Ohio Valley in which our homes have been cast—with its diversified landscape, picturesque views of lake and river, hill and valley, with its healthful climate and productive soil—it should be regarded as a matter of neglect, almost of reproach, if any one buying, building or creating a home for himself and family should fail to embellish it with some portion of that infinite wealth of beauty and charm connected with the trees and shrubs which may be had almost for the taking and planting. It should be a duty with all citizens of town or country possessed of either a small building site or broad and fertile acres to adorn them with those objects of perpetual beauty and service which do not decay as do the cottages and homes which they build, but are a constant source of admiration and delight as the years go on; for trees, unlike houses, temples and towns, do not begin to decay so soon as planted, as those other things do so soon as builded, but they grow and flourish throughout the centuries; nay, we have some with us now that existed at the beginning of the Christian era. What we start now will give joy and confer happiness upon our children's children and their posterity, or upon strangers we

know not of, and in long years to come furnish the material which may shelter other generations in homes built from the lumber of which man, ages past, had planted.

In choosing a site or location for a home, first of all attention should be given to the matter of sanitary surroundings. See that there is good natural drainage, an elevated position if possible, one commanding the sunlight in its fullest scope, and in a position to secure pure air. Next, the home grounds should be easy of access, not selected close upon the public thoroughfare, nor yet too far from it, with innumerable gates to open going out or coming in. Have as beautiful an outlook from piazza as possible, and from the windows fine views through clusters of trees, shrubs and vines. Here in this climate we have an extended range of tree growth and beauty as fine as is produced in any other part of the world. Out of the great variety of trees indigenous to our soil there is no difficulty in finding beautiful kinds adapted to any situation. Indeed, I think too many of us are ignorant of our tree wealth, often sending abroad for trees when we have had much better ones at home. One of our United States forestry commissioners says there are not more than fifty species of forest trees in all Europe worth cultivating, while here in our own country we have 800 species, 250 of which grow to the height of thirty feet, fifty to the height of 100 feet, and of the entire number fifty are of the coniferous class. A Scotch gardener who visited this country recently said in writing up his observations upon this country: "I am amazed at the indifference of the Americans to the variety and wonderful beauty of their native trees and shrubs. Their landscape gardeners are trying to grow trees of foreign nativity just for the name of it, at a cost of many failures and disappointments, when they have better kinds all about them at home." So high a recommendation of our trees and their beauty from such a source is surely worth heeding.

We shall omit all details of planting, so far as mere labor is concerned. We would say that trees will grow almost anywhere with us if taken up at the proper time in spring or fall and removed from the forest to the home grounds with care, properly set out and cared for until well established in their new home. So far as possible the same conditions should be obtained upon the home grounds for a tree removed from the forest as those to which it had been accustomed. Nursery grown trees grow more readily than forest trees for the reason that, having been transplanted two or three times, they have more fibrous roots. But little loss need be sustained if we select our trees from the edge of the wood rather than in its depths. Choose small trees—they are usually of more perfect shape, and in removing them one is sure to take up a greater proportional share of roots than with trees which are larger.

The orderly gardener would instruct us to select only perfect models of trees of whatever variety we wanted to plant, "straight of trunk, symmetrical in outline and beautiful from any point of view." But we like

a crooked specimen on the lawn occasionally. It gives variety and prevents the eye from ever tiring of such stiffness and straightness as is presented when every tree on the lawn is straight as an arrow. We do not find trees all so beautiful and straight in the primeval forest. And it seems to us that sometimes trees tire of their own stiffness, and invite the crooked vine to twine about them to give relief. So we would plant a few crooked trees among the straight ones, in order to get the best effect on the lawn.

In planting trees about home grounds of moderate extent it is generally the better rule to have each tree depend for its beauty or ornamental effect upon itself alone, rather than upon other trees. On grounds of large extent or for avenue or roadside planting, trees are often set in rows, groups or pairs. In such cases they depend upon each other to some extent for their best effect; and yet here disappointment may come in. It is impossible to make trees grow alike as time goes on, howsoever carefully they may be selected, planted and cared for. One will grow more rapidly than another, or perhaps one meets with an accident which disfigures it; another may die, thus leaving a gap and spoiling the symmetry of our plan. So we think it best to plant so that each tree will depend upon itself for the pleasing effect which it gives, standing in harmony or in contrast with its neighbor, without particular regard to size or others, habits or characteristics.

Grouping or massing trees upon the lawn or about the grounds should be carefully studied. Trees grouped or massed on the northwest side of the house serve as good windbrakes, but we would never mass trees anywhere so they would obstruct a fine view in the distance, nor should they be placed too near the dwelling. There is no hygienic agency equal to that of the sun, the true source of life. Without it plants and animals alike have but a sickly life or slow death. No trees, therefore, or anything else ought to be allowed to keep its healthful beams from striking upon our houses and coming for a while at least each day into all our rooms. Health leaves the house when the sunshine is kept out of it. Some shade on the house during the hottest part of the day is admissible, but don't allow it to become too dense. Over planting is liable to be a very general fault with those who set trees about the small home grounds, just as under planting is usually the case when efforts are made to reforest an area of land. He who is making a new place, especially, is anxious for rapid size and immediate effect, and it is not infrequently the case that from four to ten times as many trees are started as there should be. The small maple which you carry in your hand, the slender elm from the hedge row, or the small evergreen may look lonesome if given all the room when planted which they will require after ten or a dozen years of healthy growth. Thus in a little time they become crowded, and then not only is their charm and beauty as trees lost, but the highest beauty of the lawn is lost also; for nothing will make amends for the want of

some space of clear, unobstructed, beautiful turf, on which the sun may throw its light and across which may play the shadows of the clouds. The only remedy for thick planting is the ax. While we may regret to cut down a favorite tree ever so much we should not hesitate to do it if it is necessary to preserve the beauty and symmetry of the home surroundings.

Fruit trees are very much out of place on the lawn. It may suit the practical German to put apple, plum and cherry trees in the front yard, but we would prefer to have them in the orchard, or at least in the back yard. The apple tree in the full wealth of its rich fruitage is a beautiful object, 'tis true, but it does not show off to best advantage on the front side of the house. The dropping fruit is not a lawn ornament, and its branches are not beautiful except probably when in full bloom, and then only for a few days. So we would not plant fruit trees when we wanted something for ornament.

Harmony of form and color in trees with their artificial surroundings should ever be regarded. Tall, slender trees will not look well beside a low building with a flat roof, nor will broad, round-topped trees beside a tall building with a sharp roof. It is the rule of personal vesture applied to the forms of arboreal beauty. Tall and short men should dress differently. The hat that would set becomingly upon one would look unbecoming on the other. Color should be studied; not only the spring and summer tints of virgin and mature leaf, but the ripened and brilliant hues of autumn.

Some one may ask, Is there any money in this ornamental work of embellishing the home? We would say most emphatically there is, as well as satisfaction and pleasure. Who would not give several hundred dollars more for a home set in the midst of a fine lawn than one with house standing out in the hot, blazing sun the whole day long without a single tree to cast its shadow and invite the cool breath of the summer breeze across the threshold. We could cite a number of instances where lands have been doubled and trebled in value simply by ornamenting the lawn with trees and giving the home an attractive, comfortable appearance. Not infrequently do we hear of a tree located somewhere upon the lawn being valued at one or two hundred dollars; at least the owner would refuse to part with it for that money. Who, least emotional of mortals though he may be, has not, at some time, if indeed he has not often, felt a tree to be a precious thing, the tired wayfarer, reclining by the dusty roadside under its cool, refreshing shade? What more truly humane picture than that? A party of old and young of both sexes, picnicking on a summer's day beneath the spreading boughs of some grand old oak. How could such a happy scene be complete without that tree? Yonder lofty and majestic elm, the growth of a century, standing beside the farmhouse, which, though ample in size, it dwarfs to a cottage as it rises above it with its dome of shade and tosses its giant arms high

over roof-tree and chimney top! What an object to fill one at the same time with wonder and admiration. How it starts deep and meditative thoughts even in the most careless beholder. The lordly pine or hemlock, refusing to be robbed of its beauty at any season of the year, but sighing like a hundred Aeolian harps with every breeze and holding itself before us as an emblem of life and immortality, to cheer us when all around is wrapped in the chill white robe of winter, what object on earth, next after the immortal man himself, is more beautiful or more noble? Man can not replace in a lifetime what his ax may destroy in an hour. It has taken a lifetime and more of the past to build up that miracle of beauty—a tree; so let us each and all strive to preserve and perpetuate for the admiration of future generations some of those magnificent miracles of beauty and grandeur yet left us.

DISCUSSION.

Discussion was led by Prof. W. C. Latta, Purdue University.

Professor Latta: I take it that the people who are gathered here are not like the old Arab that I heard of some years ago. I might tell you of him because it might be the means of converting some to trees. This Arab was observed sitting in the hot sun at his home, by a traveler, who, seeing him there in the heat, said, "Why don't you plant trees and have shade?" His answer was, "Oh, if I do, I won't live to enjoy it." If I thought you were like him I would not have the heart to say anything on the subject. You have listened to an interesting and valuable, and even eloquent paper, and a man speaking extempore, could not heighten the effect. I only want to supplement in some degree what has been said. I may touch on some points, but I want to bring up the practical side of the subject. I also want to emphasize the teaching effect of the tree and call attention to the necessity of some little insight into the nature and habits of trees, in order that we may get the best results from them. On this last point I can not hope to inform you, but I think the discussion will bring out some practical information as to what trees are best for certain aspects and soils. In general I would say that the tree should be adapted to its purpose in form, habit and growth and its adaptation to the kind of soil. In riding along between here and the Reform School my attention was called to a park where they had to haul in a quantity of soil to give each tree a good start. They have evidently studied the feeding of trees. We need to note the combinations of trees. I agree with Mrs. Stevens that we want a tree for its own sake. We can not bring out combination effects on small grounds. There are trees that have the spreading habit, the clumpy habit and the spirelike habit, and trees of variation in shades, and those who have observed them in public grounds know that very pleasing effects can be brought out by suitable combinations,

but that takes more room than most of our home grounds could give. I do not endorse these small home grounds, but in many places they could not be made larger, but I want to say to young people starting out, that if you try to make a home on a little 8x10 piece of ground, you will be sorry for it. Let me recall a point here. It will come up in your experience in the development of home grounds. It is my own experience. During my college course I was put in charge of the walks and drives of the campus, perhaps sixty or more acres, and I set to work with edging shears with great enthusiasm as I went over my work, but I had short-lived satisfaction. In one week I was shocked at those curves. You will have the same experience, and in this kind of work of tree planting it is not easy to correct your work. I want to endorse a point in the paper that we should seek the ornamental trees rather than the economic in our door yard. I do not like a fruit tree in the front yard, no matter how beautiful it is. The economics ought not to go in the front yard. The economic and the aesthetic do not mix. The fruit tree frequently becomes imperfect in form. Will you not bear me out in this statement that you have seen farms in which the sore spot was a few old apple trees?

As to the number of these trees. Again I find myself in accord with the writer. It is natural to overdo and it is hard to undo. We can not bear to take out a tree that we have nursed for years. In looking around even here I can see where the ax could be used to advantage. The trees keep growing and spreading, and when they get beyond a certain point it is hard to take one out without spoiling the effect. A densely shaded lawn is a gloomy, unhealthful spot. We want to have in mind the effect ultimately. I should advise planting thick enough to take some out. In regard to the disposal of these trees I did not note this point in the paper. The disposal is a very important matter. There are two great objects in view in planting trees around a home. I fancy that most people think of the effect it will have in setting off the house. That is, "how it looks to the other fellow." There is another side. How does it look to the inmates who look at it from the inside? We want to plant these trees so they will give a beautiful setting and surrounding to the home. We want the place to look attractive to our friends and as we come home. We want to plant what is attractive and beautiful and also shut out what is not so. Have you ever thought what a striking advantage the farmer has in the way of home embellishment that the man in town does not have? The banker with his fine dwelling may have some disagreeable old smokestack within fifteen rods of him and he can not shut it off. If you will notice in the city you will see these things. You locate on the center of your farm and want to be monarch of all you survey. No matter how unsightly a thing may be near you, you can shut it out from view forever by a tree or two, and you can make it more beautiful by suitably placing the trees. The man in the country has the power to do this if he has the artistic sense and judgment to do this work. We plant these trees

for their shade, for their combination effect; we plant them to some extent as a windbreak and a screen. There is one mistake made more than any other in the disposal of trees, and that is in straight rows. We have forgotten the purpose. We plant a tree here that will give shade or make a pleasing combination, and we forget for the time being that we want to assist nature and don't want the marks of man's handiwork. You do not find trees planted in rows by nature. Straight rows are allowable on the roadside, but they are stiff and lacking in taste in the home grounds. I now come to the part that I want to emphasize. What is the tree without its setting? What is the diamond without its setting? It loses all its utility and half its beauty. What is the setting of a tree? That is a beautiful, grassy lawn. That is necessary to give the best setting for trees. Here it is necessary to have sunlight to make the grass grow. If there is anything more neglected on the farm than the old apple trees, it is the farmer's lawn. It is not as easy to have a good lawn as it is to set out a few trees. It takes care, but a good lawn can be made on any soil where grass will grow. I wish I had Mr. Reagan here to tell you about our lawn at the Experiment Station. I came to Purdue in 1882. I found a bit of black soil by the experiment station and all that was done that fall was to level it. It was simply bare ground. That was leveled and allowed to stand during the winter. It was good black soil, and the next spring it was relevelled. It left a very even surface. That is very necessary to a good lawn. Do not sow grass without evening your ground in good shape. This was sown with oats and afterward we sowed a mixture of grasses that do well with oats. The oats were thoroughly harrowed and then raked in. When the oats were three inches high we began going over it with a lawn mower. The farmer has observed that in the spring the wheat, corn and oats ground is not as dry as where there is no crop growing. It seems to give an encouraging condition for young grass. As soon as we began to cut the oats it began to form a light mulch. By the first of August the oats were killed out, and we now have a beautiful lawn. Mr. Reagan remarked that he never had seen so good a lawn made in such a short time. When you have shapely trees on a beautiful grassy lawn you have a home where men and women of generous mold, with good ideas, can be developed.

Mr. Burton: I had particular instructions before I left home to ask how to keep out quack grass. About this time of year it gets so thick we can't cut it with a lawn mower.

Professor Latta: I did not promise to answer the hard questions. Perhaps I did omit one thing, and that is in our selection of grasses we naturally had to recognize the natural adaptation of the soil. I do not know whether blue grass can be readily grown there or not. I do not know how to kill out quack grass in the lawn. I believe I would mow early and late.

Mr. Sylvester Johnson: I listened very attentively to the paper and discussion, and there is much to commend, especially in Professor Latta's discussion. I want to emphasize what he said about the lawn. He did not exaggerate the Purdue lawn. There is just one thing in the paper about which I am not quite able to agree with the writer, although she and I hardly ever disagree on anything, and that is these crooked trees. I can not quite get myself educated to plant crooked trees if I can get straight ones. I don't like them. There is another thing that I like to see straight, and that is straight corn rows, and I despise to see crooked corn rows. Not only in the corn field, but I also want to see them in the garden, but I don't want to see them in the front yard.

Mrs. Stevens: In defense of my crooked tree idea I will say that when Mr. Stevens and I were married I had never lived in the country. We moved on a farm just outside of town. The first thing he did was to stake out about twenty acres of wheat land and put in trees. It cost as much to fence it as the land was worth. Mr. Stevens said that he hoped to have in twenty years timber more valuable than that. In speaking of the lawn, I will say that the yard is the most neglected. This is what we had. We decided to take out the fence and have a lawn. We now have about sixteen acres. You people here do not know how pretty a southern maple tree is. He decided that they must be perfectly straight, and it was more trouble to get them straight than anything else. Our representative of forestry came down and asked what made him plant a sugar orchard in the front yard. I was completely disgusted when my eyes were opened. He said the object was to get them planted as near like the forest trees as possible. Nothing has done it so effectively as the crooked tree.

Mr. Little: I think that Mrs. Stevens is right in her description. Suppose you would employ some person to paint a nice landscape. If he would make all the trees nice, you would condemn it, as there would be no variety in it. When I go to the forest, my greatest delight is scanning the variety of trees. There used to be a mistake made in cutting trees back. There is nothing more beautiful than to have the trees as nature made them. In planting trees we plant them for beauty, but how many will think of the intrinsic value that is added to our homes by planting trees? We sometimes pay big prices for homes and farms simply because we admire the trees. While we are ornamenting our grounds by planting trees, we are adding great value to them.

Then followed a paper on

SOME GOOD FLOWERING SHRUBS FOR THIS LATITUDE.

C. M. HOBBS, BRIDGEPORT.

By flowering shrubs we mean the low growing, bushy, hardy, flowering shrubs that are planted on our lawns for their individual beauty, or in clumps for their collective effect. Such shrubs are well adapted for the embellishment of our lawns because of their hardiness, the ease with which they may be grown, their variety of form, color of foliage and bloom, and the fact that if proper selection is made we may have them flowering in succession from very early spring till late in the autumn.

If shrubs are planted singly they should be kept healthy and vigorous, not lacking for moisture or fertility, and always of shapely and attractive form by proper pruning. When grown in clumps or masses, the taller growing varieties should be placed in the center and the lower ones on the outside, that all may show to proper advantage; if to be seen from one side only, the taller shrubs should be in the rear and the lower in front. The taller growing shrubs may be used with good effect in screening from view unsightly objects; the lower growing kinds for hedges and borders to walks and drives.

There are hundreds of varieties of cultivated shrubs. I think it not best to confuse the planter with a long list of names, many of these not being hardy or adapted to this latitude. We will mention a few of the most desirable varieties for our locality, covering as nearly as possible the entire season in their blooming, and will name them as nearly as possible in their order of flowering.

Magnolia stellata is the first shrub to show bloom here, commencing to bloom about the fifteenth of April of this year. This variety is comparatively new. It is a low growing, upright, compact shrub with good form and foliage and perfectly hardy. The flowers appear before there is any foliage, are two to three inches in diameter, star-shaped, pure white and very fragrant.

Magnolia soulangeana, *speciosa*, *alexandriana*, *lennel* and others are stronger growing, larger leaved, and blooming a little later than the *stellata*. The flowers are larger, pink and white, with little fragrance. These varieties usually kill to the ground in very cold winters, sprouting up again from the roots the following season.

Magnolia glauca is a native of some of the Atlantic States. The shrub attains a considerable size, is rather straggly or open in habit, perfectly hardy here, leaves small compared with other varieties, of dark, glossy green. The flowers are about three inches in diameter, white and very fragrant; it is the latest blooming of the magnolias.

Forsythia, golden bell, is not entirely hardy, killing back considerably in very cold winters. It is of medium height, with spreading, drooping branches. About the middle of April the under side of the branches are heavy with small, bright yellow, bell-shaped flowers, hence the name golden bell. If this shrub can be planted on the south side of buildings, or where it can have protection against the northwest winds, it will prove quite satisfactory as an early bloomer.

Exochorda grandiflora is entirely hardy here. It attains about the size of the common *syringa*, blooms about the 25th of April, flowers about the size and shape of the *syringa*, without fragrance. Its hardiness and early blooming, pure white flowers with bright green foliage, make it desirable.

Spirea thunbergii blooms with the *exochorda*. This is a rather low growing, bushy form of *spirea*, with graceful, drooping branches and very small, narrow leaves. The flowers are very small, double, white, and appear in great profusion before the foliage. This is not a very conspicuous shrub when in bloom, but its graceful, drooping habit and fern-like leaves make it an attractive object the season through.

Spirea prunifolia, bridal wreath, follows the *thunbergii*, with its mass of very double, small, pure white flowers. It is hardy.

Cydonia japonica, Japan quince, robes itself in scarlet about May 1st, and with its contrasting green leaves is always the most attractive thing on the lawn at that season. Extremely cold winters kill the flower buds, and it is not always reliable in blooming. The scarlet and pink are the most desirable varieties.

The Flowering Almond is not to be despised if it is quite common. Blooming early, with its small, very double, bright pink flowers in great profusion, it never fails to gladden the eye.

Beginning about the first of May and continuing till the 1st of June, we have a great variety of lilacs. These are among our best shrubs. Hardy, easy to grow, making a compact, stately shrub when properly trimmed, and with a proper selection of varieties will continue in bloom for a period of thirty days.

Syringa vulgaris or common purple lilac, is desirable on account of its color, fragrance and free blooming habit. The common white is pretty, but very tardy in coming to flower. The *Alba Marie* is a shrub of better form, comes early into flower, and is a satisfactory single white.

Madam Lemoine is the most desirable double white. The shrub is vigorous, compact, symmetrical in form, good foliage, early and free bloomer, with very large panicles of pure white, double, fragrant flowers. *Charles X* is a strong, vigorous bush, of good foliage, very large trusses of reddish purple flowers. *Pres. Grevy* is a beautiful blue, double, large panicles, and very satisfactory. *Lovaniensis*, silvery pink, distinct panicles, large and showy. *Ludwig Spaeth*, purplish red, long panicles, showy, fine.

Of the very latest bloomers, as far as we know, there are no varieties superior to *Josikaea*, purple; and *villosa*, light pink. These are distinct, compact, shapely shrubs from Japan, large leaves, making fine appearing shrubs when not in bloom. To my taste the *villosa* is one of the prettiest of lilacs; the panicles are large, branching; the buds are pink before opening and white when open, giving the panicles a very delicate pinkish white shade, with a pleasant perfume. These two varieties bloom the last of May and first of June.

The Japan tree lilac, so far as I know, is the latest of this family in blooming. This is a strong grower, shaping up like a tree and attaining several feet in height. The flowers are in large panicles, creamy white and fragrant.

Syringa persica, or Persian lilac, is a pretty shrub, blooming with the common varieties. They attain a height of six to eight feet, are rather spreading and open, leaves small, and the shrub somewhat resembling the privet. The flowers are in large, open panicles; two varieties, purple and purplish white; fragrant.

Viburnum sterilis, or snowball, is an old and deservedly popular shrub on account of its hardness and vigor, and its mass of balls of sterile white flowers. Blooms here from middle to last of May.

Viburnum opulus, or high-bush cranberry, resembles the common snowball, except that the flowers are small, perfect, appearing in broad panicles, and followed by small bright red berries that hang on till cold weather.

Viburnum plicatum, or Japan snowball, is decidedly the prettiest in shrub and flower of this family. The shrub is medium in height, rather compact, foliage rather large, with distinct corrugated leaves. Flowers in large, compact balls, pure white. It is not entirely hardy here, kills back some in severe winters.

Lonicera tartarica, or upright honeysuckle, blooms here from the 5th to the 15th of May. There are several varieties, but for general planting two varieties will answer, the pink and white. The flowers are small, not very conspicuous, slightly fragrant. The beauty of the shrub lies in the symmetrical, compact form of the shrub, and its dark, fresh green leaves the season through.

Spiraea van houttei flowers here usually from the 10th to 20th of May. This is certainly the finest of all the *spireas*. Perfectly hardy, four to six feet in height, open habit, long, graceful, drooping branches covered with a mass of compact bunches, or balls, of white flowers. It has to be seen to be fully appreciated.

The *chionanthus virginica*, or white fringe, comes into flower about the 20th of May, and continues about a week. The shrub attains a height of eight to ten feet, and has large, glossy, dark green leaves the season through; is a fine shrub when not in flower. The flowers are in long, open, gracefully drooping racemes, pure white, with a rich spicy fragrance re-

sembling the carnation. The Purple Fringe, or smoke tree, is less desirable; straggly in habit and given to blighting.

The diervilla, or weigela, is a deservedly popular shrub, of which there are many varieties. But considering hardiness, regular and abundant bloom, there is nothing surpasses the rosea. The rosea grows four to six feet in height, rather spreading, and the slender branches are literally loaded down with large, bright pink, bell-shaped flowers. Eva Rathke, a new variety, is said to be a brilliant crimson and very fine. The white varieties do not bloom sufficiently, and are of a dirty white, unattractive color.

Philadelphus, or mock orange, erroneously called syringa, flowers the last of May and first of June. Generally this is a tall, rather open, straggly bush. There are several varieties; the large flowered, fragrant variety is very fine. The flower is large, pure white with sweet fragrance.

Deutzia crenata flore plena, or double flowered deutzia, is to my taste the prettiest of its class. The shrub stools out from the ground numerous slender branches four to six feet high. The flowers are well distributed along the stem, rather small, double. The outer petals are pink on the outside, the inner petals pure white, making a combination of pink and white that is delicately beautiful. Unfortunately severe winters here kill it to the ground. I have never known the roots to be killed.

Beginning with the first of July, a number of spireas begin blooming, and continue through the month, when there are few if any other shrubs in bloom.

Among these are spirea billardi, having small spikes of pink flowers through July and August; spirea douglassi, with large spikes of small rose-colored flowers through July and August; spirea callosa alba, a low dwarf shrub covered with a profusion of white flowers through June and July; spirea anthony waterer, a very low dwarf shrub, flowers dark pink, blooms in profusion from first of July till late in the season, the most desirable of the late spireas.

Hibiscus, althea, or rose of Sharon, begins blooming here about the middle of July, and continues for three or four weeks. There are a great many varieties of these, double and single, with various shades of red, purple and white. Unfortunately these fine late bloomers are quite tender here when young; if plants can be protected from the severe winters for a time, until they get some age, they will stand most of our winters.

Hydrangea paniculata grandiflora, or large flowered hydrangea, is one of the most satisfactory shrubs in cultivation. Perfectly hardy, commencing to bloom the first season after planting, and continuing in flower from the first of August well into September. If it can be planted in a moist, rich situation, with partial shade, it will astonish us with its immense pyramidal panicles of white flowers for nearly two months.

There are a few shrubs that are desirable on account of their attractive foliage the season through. Some of the most desirable of these are

cornus sanguinea variegata, or the red-branched, variegated-leaved dogwood. Planted in a cool, moist, shaded situation, this is a very handsome plant summer and winter. The leaves are of medium size, light green, clearly margined and splotted with white. At a distance the leaves appear to be flowers. In winter the branches are bright red.

Sambucus aurea, or golden-leaved elder, resembles the common elder, except that it blooms but little and fruits none. The leaves are a glossy, rich green, with a rich yellow that makes it very showy.

Prunus pissardi, or purple-leaved plum, is one of the best purple-leaved shrubs. The leaves are a dark purple the season through. *Berberis purpurea*, or purple barberry, is a good, low-growing, purple-leaved shrub. *Diervilla variegata* or variegated weigela, there are two varieties, one with green and yellow leaf, the other with green and white; both are quite pretty.

Philadelphus aurea, or golden-leaved philadelphus, is pretty but winter kills in severe weather. *Hibiscus variegata*, or variegated althea, has a very distinctly marked foliage of white and green.

Some of the best shrubs that are grown on account of the attractiveness of their fruit or berries, are the barberries; *euonymus americanus*, or strawberry tree, with red and white fruit; the *lonicera tartarica*, or tartarian honeysuckle, with red and yellow fruit; *symphoricarpos racemosus*, or snowberry, with white berries most of the winter; *viburnum opulus*, or high-bush cranberry, bright red fruit in large clusters till severe weather.

We have not mentioned here the dogwoods, double flowering peach, cherry, and many other varieties. On account of their size they properly belong to the class of flowering trees. There is a small, bushy tree of recent introduction that might be included in the list of shrubs, that is, the double flowering crab. This is a sport from our native crab. It is of rather low, bushy, compact habit, blooming about the period of our common varieties of apple. The flowers are large, very double, appearing all over the tree in great profusion, color light pink. The flowers are so large and double that they resemble small roses and have the delightful fragrance of the wild crab. I know of no small tree or shrub more attractive when in full bloom than the double flowering crab; the only objection to it is that it remains in bloom but a few days.

DISCUSSION.

Mr. Davis: I would like to ask if that cranberry is what is sold for the tree cranberry? Is the fruit good? Is the barberry good to eat?

Mr. Hobbs: That is the tree cranberry. I do not like the fruit. There is an edible variety of barberry.

Mr. Davis: Is this the barberry that is used for hedges?

Mr. Hobbs: Yes.

Professor Latta: I would like to ask about the winter effect on these shrubs. To what extent is it advisable to plant shrubs on the lawn? What proportion of the planting should be of shrubs?

Mr. Teas: I think a clump of shrubs on a lawn of reasonable size is so essential in the summer time that they can be gotten along with in the winter.

Professor Latta: Is the clump method the best for planting on the lawn?

Mr. Hobbs: That depends on the size of the lawn. If large, I think the clump is desirable.

Mr. Ratliff: I will state for the benefit of the Society that the Pan-American Exhibition will meet at Buffalo next year. It is the object of the commission to have on exhibition American fruit in connection with other exhibits, for the purpose of showing what can be produced in the northern hemisphere. These fruits would have to be secured, packed and placed in cold storage for the early part of next year's exhibit. First, to show what was grown in 1900. Second, to test the value and efficiency of cold storage, and third, to keep up a continuous display of ripened and fresh fruits grown the year previous. In a letter I received, I was urged to bring the matter before the State meeting with the hope of getting the co-operation of the society, or at least enough from individuals, to make a creditable display. It is true that California can furnish and keep on exhibition a greater variety of fruits than we can in the middle States, but Indiana fruits at the World's Fair were not complete. Last season some members of our Horticultural Society, as well as those of other States, succeeded in selecting and preparing American fruits that were shipped abroad under the cold storage system, and it is very gratifying to state that at the Paris Exhibition, Indiana fruit came off second. This Pan-American exhibition is near at home, and I am willing to give my time and fruit to aid in making the exhibit a success. It is likely premiums will be awarded to enable people to make exhibits. I think it is our duty as a Society to get up sufficient interest to assist in making a creditable Hoosier display. I speak of this matter at this time as the fruit ripening in the early fall and winter will be the only fruit accessible and which will keep in cold storage for next year's exhibit.

Professor Troop read a letter from Wm. A. Taylor, Assistant Pomologist at the Paris Exhibition:

Prof. James Troop, Sec'y Indiana Horticultural Society, Lafayette, Ind.:

My Dear Sir—Having just returned from the Paris Exposition, where I have had charge of the U. S. Horticultural Exhibit, it gives me pleasure

to inform you that in the temporary competition of June 27th, the collection of apples of the crop of 1899, exhibited by your Society, was awarded a second prize, "Deuxieme Prix," by the jury of awards.

The collection installed for that competition consisted of five (5) varieties displayed in quantity. They were collected by Mr. Walter S. Ratliff, Richmond, Ind., and were furnished by growers as follows:

Ben Davis—C. Rodenburg.....	Richmond, Ind.
Ben Davis—Alice Eliason.....	Richmond, Ind.
Ben Davis—Richard Sedgwick.....	Richmond, Ind.
Gilpin—Richard Sedgwick.....	Richmond, Ind.
Indiana Favorite—Dill Addleman.....	Richmond, Ind.
Mann—Columbus King.....	Centreville, Ind.
Stark—Dill Addleman	Richmond, Ind.

The fruit was in fair condition but had apparently been rather too ripe when placed in storage last fall.

The outlook is good for choice American fruit in the markets of France as well as in other European countries.

Thanking you for the active interest you have taken in the success of the fruit exhibit, and trusting that it will be of distinct benefit to your State, I remain,

Very truly,

WM. A. TAYLOR,

Acting Pomologist.

P. S.—In addition to the above I would say that the specimens of the fruit of most of the varieties in your collection were included in the general collection of apples of the United States of the crop of 1899, which was awarded a first prize in the same competition.

DISCUSSION.

Professor Troop: It seems desirable that we take some action on this subject at this meeting.

Mr. Burton: I am not posted on this particular exhibit, but I did send about two barrels of apples to Paris, but when I started them I hardly expected they could be sent. I thought they were too ripe. If we undertake this matter we want to be very careful to know who is going to pay the expenses and what is to be done. In case we save our apples we must save them in time. The Department of Agriculture sent me the paper to wrap them in. We should have arrangements made so as to know where to get this paper. I would like to ask if the Society is able to bear the expense?

Mr. Hobbs: I would suggest that this matter be referred to the Executive Committee.

Professor Troop: I do not think it is known what the expense will be. As far as the Society's finances are concerned, they are getting rather low and probably by the time we hold our annual meeting we will be at the bottom of our pile. I don't know whether the exposition will bear the expense or not. Last year the government bore all the expense after they were put into cold storage, and also paid the freight. I think very likely if the Society makes an exhibit at Buffalo next year it will have to pay the expenses. It seems to me that the State should be represented there. It will be no small fair. I was there about two weeks ago and went through the exposition grounds and was in the horticultural building. It is going to be an immense affair. It will be as large as the horticultural building at the World's Fair, and some of the other buildings will be larger than the World's Fair buildings. I think we ought to take some interest in the matter and have our State represented. In order to do that we will have to begin this fall.

Mr. Flick: Could the Executive Committee take this matter under advisement and report just before the State Fair? Would it not be a good plan to do this?

Mr. Burton: If we are going to save our early apples we must begin at once. Some will have to be gathered before the State Fair, and this matter should be acted on in a few days and information given out to all horticulturists. I am willing to help make this exhibit. Some varieties should be gathered and placed in cold storage before the State Fair. This should be referred to the committee.

Mr. Ratliff: I move that the members give this matter thought and that it be the first thing disposed of at the morning session. It will be almost impossible for the officers of the Society to estimate the expense connected with an exhibit of this kind. In some parts of the State there is more fruit than in others. If the Society does not feel like bearing the expense, each individual could, and if he did not get the direct benefit out of it, would help the cause of horticulture.

Motion seconded and carried.

Adjourned.

EVENING SESSION.

The following is a brief abstract of Prof. W. C. Latta's illustrated lecture on "Agricultural Education" delivered at the evening session:

Agricultural education is thoroughly established in many European countries, but it is comparatively a new thing in the United States. The

oldest of the existing agricultural colleges was established only a little more than forty years ago, near Lansing, Michigan. In 1862, Congress first made provision for the establishment of agricultural colleges in the several States and Territories. In 1889, Congress passed another act, making increased provision for these land grant colleges. Nearly every State now has an agricultural college. For a number of years these colleges did not prosper. This was due partly to meager equipment and inexperienced teachers and partly to the distrust of the general public as to the value of scientific training for the farmer. Gradually these colleges have come into favor and their patronage is increasing from year to year. A number of the States, notably New York, Ohio, Michigan, Wisconsin, Illinois and Iowa, have made very liberal provision for agricultural education.

Notwithstanding the meager equipment and limited facilities of the Indiana Agricultural College, substantial progress in agricultural education has been made in Indiana.

The agricultural graduates of Purdue (the Indiana Agricultural and Mechanical College) are largely engaged in the several agricultural pursuits for which they were trained. Nearly all the two-year and winter-course students of the School of Agriculture are now engaged in farming. The agricultural course at Purdue is doing well the work for which it was intended. It should have the support and patronage of the farmers, fruit-growers, stockmen and dairymen of the State.

The purpose of an agricultural education is three-fold.

1. To impart a good general education which tends to make strong, public spirited, helpful men.
2. To give a training in the natural sciences with special regard to their applications to agriculture.
3. To inspire young men and young women with a love for agricultural pursuits so they will engage in farming from choice, and not from necessity.

Many of the earlier agricultural graduates of Purdue are already succeeding well on the farm. They are demonstrating the feasibility and advantage of uniting science with practice in farming. They are taking an active interest in local affairs and lending a helpful hand in the enterprises which interest their respective communities. They are broader, truer and more helpful men and citizens and more successful farmers as a result of their training at Purdue. The school of agriculture not only merits the moral support and patronage of the farmers of the State, but should be provided by the State Legislature with better buildings, better equipment and a larger teaching force. The demand for agricultural education is just beginning to grow and those States which promptly equip their colleges to do the work that is needed will lead the van in agricultural education. Indiana is a great agricultural State and should have an agricultural college second to none in the country.

DISCUSSION.

In the absence of Mr. H. F. McMahan, who was to have led the discussion, Mr. J. B. Burris, of Cloverdale, was called upon.

Mr. Burris: I presume the reason I am called upon to say something is because I am a Purdue graduate. I do not know that that is at all complimentary to the institution, but I have always been glad that it happened.

There is one point I want to mention, and that is the per cent. of Purdue graduates that leave the school and go back to the farm. When I went back to the farm, the people looked on the methods which I tried to introduce in an incredible sort of way. Do not do this. It is unfair. If a graduate of Purdue comes among you, let him have his own way without ridiculing him in any way. If his methods are new, see if they are practical. If there are any people who are slow to adopt new methods, it is the farmers. The American farmer is a king. Sometimes we think our lot is a hard one. There is much to learn. A little more than a year ago I returned from a trip around the world, and I repeat that the American farmer is a king. No place will you find such farmers and such progress as in America. Germany, with its boastful agriculture, uses very little machinery. I want to say that our condition is vastly better than any other country. When words are spoken in regard to agricultural education, many are inclined to think it is something the average farmer can not interpret. That is not so.

Adjourned.

FRIDAY MORNING, AUGUST 17.

The matter of the Pan-American exhibit was taken up and discussed.

Moved and carried that the matter of fruit exhibit at Buffalo be left to the Secretary, Prof. J. Troop.

Professor Troop: I want to make a request of the Society that if any one here has or knows of specially fine apples, that you correspond with me.

The next was a paper on—

THE GROWING OF FANCY STRAWBERRIES.

J. D. NEICEWANDER.

Through the courtesy of your local committee on programs a paper on "The Growing of Strawberries" was assigned to me to be read at this meeting of your Society. The subject as assigned is without limitation, and treated broadly only the more general principles could be considered in a paper such as is expected on this occasion.

After thinking the matter over, I felt that a more satisfactory as well as profitable paper might be written on some special branch of the subject.

Selection and preparation of soil, systems of growing, tillage, varieties, picking, marketing and the like have been elaborately written about alike by the gushing theorist and experienced grower, and little new can be added, although much might be eliminated. Writers on this branch of horticulture are apt to round out and embellish the facts with a boldness of fancy hardly inferior to that of Jules Verne in his palmiest days. Everywhere the gulleless reader is led to believe that here indeed is a veritable Klondyke of teeming riches. One modest grower writes that he has just harvested from 12,000 to 14,000 quarts of choice berries from an acre and sold them at from 15 to 20 cents a quart wholesale, thus realizing the enormous returns of from \$1,800 to \$2,800. One thousand dollars per acre is as easily achieved—on paper—as falling off a log. The fact is, the growing of strawberries seems to inspire an exuberance of feeling, and richness of fancy exceptional in horticulture. The berry is itself typical of this spirit. It represents to the sight and taste the most exquisite properties of nature. After all much must be forgiven to the grower of this prince of fruit.

In the preparation of this paper I have avoided, as far as possible, the merely theoretical and have endeavored to sketch, as faithfully as may be, my own experience with the strawberry. All varieties of strawberries now in cultivation in this country are the products of hybridizing, crossing and recrossing of two American species—*F. Virginiana* and *F. Chilliensis*. The Virginia strawberry is a somewhat small plant with thread-like roots which penetrate deeply the soil and resist the hurtful effects of the extreme heat of summer. It sits deep in the soil and hence is not easily injured by winter freezing. The stem of this native species possesses a natural tendency to divide at the base, old plants often exhibiting several divisions. The Chili strawberry plant is larger than the Virginia, its roots thick and fleshy and more superficial as a rule. For this reason they suffer more from the August sun—summer-killing as it is called. The stem of this species divides or branches at the top and

tends to grow up out of the soil, often presenting a shouldered appearance, thus making it an easy victim to the destructive effect of alternate freezes and thaws. The fruit of the Chili berry is larger, handsomer and milder flavored than that of the Virginia, and being suited to the climate of western Europe, especially England, has always been a favorite there. On the other hand the comparative severity of our climate, especially as regards heat and humidity, has compelled the American grower to depend largely on the hardier, though less attractive, Virginia berry. Of late years, scientific American growers have given much attention to the improvement of the strawberry by the introduction of new varieties embodying the best characteristics of both native species, until to-day our best varieties, while well adapted to our climatic requirements, are unsurpassed anywhere in the world for beauty, quality and size.

From the general facts just given it well be seen that an intimate knowledge of the characteristics of the two native species is indispensable to an intelligent improvement of existing varieties. But this of itself is not sufficient. The scientific strawberry grower must add to this a thorough knowledge of soil and climate. Improved varieties result from a judicious combination of all these facts according to the law of mutual adaptability. This industry has lost thousands of dollars by the injudicious dissemination of varieties possessing nothing but the most local adaptability and practically worthless outside of its native environment.

Passing from this statement of general facts, I shall proceed at once to the subject of this paper, "The Growing of Fancy Strawberries, or Growing Strawberries for the Fancy Market." What are fancy strawberries and how may they be grown are the foremost questions in this connection. I shall attempt to answer the latter first. The wide-matted row, the narrow-matted row, the modified hill and the hill are some of the many systems by which the strawberry is grown. Of these I prefer the hill or modified hill as productive of the finest strawberries and as best adapted to the growing of strictly fancy berries. Given a sufficiently fertile soil and suitable varieties, the hill system yields the finest berries. The modified hill—that is, the old plant with the addition of not to exceed four suitably spaced runner-plants, is nearly as satisfactory. The matted row is unsuited to the growing of high-grade fancy berries.

What is a fancy strawberry? Doubtless every grower feels more or less competency to answer this question. I have never yet become acquainted with one whose modesty impelled him to admit that his berries fell far short of a fancy standard. Now, it is a fact that many strawberry growers do not know what a fancy strawberry is. They think they do, but they are mistaken. The grower of fancy strawberries is guided by a clearly defined ideal. To the ordinary grower a strawberry is a strawberry. To the fancy grower every strawberry has a distinct individuality and to be fancy must satisfy his ideal. The common grower is impressed by the quantity merely, the number of gallons, crates or

bushels, and is oblivious to the individual. Ideals vary; some are high, others low, thus giving rise, anomalous as it may seem, to grades of fancy berries. Let me try to describe a high grade fancy berry. It should possess a very high degree of merit with respect to each of the following essentials: Firmness, color, form, size and quality. Freshness is a condition always assumed, without which the fancy strawberry could not exist. The most important of the essentials named is firmness. Without firmness a strawberry loses its individual identity and become a formless mass of unsightly pulp. The important element of form is regularity of surface rather than shape. Rough, ridgy, cox-combed and fan-shaped forms are undesirable. The position and arrangement of seeds must not be overlooked. Strawberries with depressed seeds will not bear handling and the crowding of seeds about the apex of the berry is unsightly. As to size, the bigger the better. In color, the element of glossiness is foremost. A glossy mahogany red is much sought after. The Warfield and Brunette are fine examples of this type. A bright, glossy, strawberry color—that is the natural color—is my favorite, and is very popular in the Indianapolis market. Quality is the least important of the essentials named. Yet it should be the very best attainable without a sacrifice of the more important elements. The berry I am trying to describe should possess a distinct aroma and flavor; should be neither excessively sweet nor sour, and with a moderately juicy pulp. The calyx should be green, not too large, and easily detachable from the stem.

Now a few words as to varieties. It is time wasted to extol or recommend any particular collection. Only a very few berries have sufficient adaptability to be called standards. The introducer of new varieties who would avoid the notoriety attaching to kinship with Ananias should be careful to qualify his descriptions. Every statement of fact should be accompanied by its circumstantial if's—soil, tillage, method of culture, pollination and climate—these are a few qualifying incidents in ever varying degrees of potentiality.

There are, however, a few varieties of conspicuous merit—that is, of considerable range of adaptability. It is not revealed to man as to which is foremost in this group. Nothing would be more perplexing to our distinguished presiding officer than the personally addressed query, "Which is the best strawberry?" The speaker's innate modesty forbids his naming it. He proposes, however, to nominate a very few candidates for the distinguished honor. The qualifications are a well-drained and fertile, sandy loam, thorough tillage and the hill system.

Of more than forty varieties tested, the Enormous easily leads all others. The Warfield is second and has always held this position. The Warfield, as I grow it, comes more nearly meeting the requirements of a high-grade, fancy berry than any other I have ever tested. For an extremely late berry the Aroma is preferred. I do not know of a profitable early berry. I have had one paying crop of Brunette's in five years. This

berry is overrated as to quality. Its one salient, gustatory fact is sweetness. It is almost entirely flavorless but of surpassing beauty. It is the berry for impaired digestive conditions and may be eaten with impunity when other varieties have a hurtful effect. Of new varieties, Splendid, Clyde and Ridgway are promising. The Glen Mary is a failure. Of old varieties now under trial I am favorably impressed with Parker Earle and Haverland. Of the many new varieties introduced and exploited in the past ten years, in language that would beggar the hyperbole of the Chinese Boxer in describing the virtues of the allied forces now haply in Peking, the great majority have passed into a desuetude, so innocuous as to be unworthy of mention.

In this connection I wish to submit some general facts that have come under my observation. Different varieties represent distinct types of plant growth. Some assume the rosette form, their leaves spreading rose-like on the ground. Others form a dense top of more or less erect short-stemmed leaves. Still others develop a loose open top, composed of a few long stemmed leaves.

Few of the rosette type have done well with me. Without exception, the compact, closely-crowded cluster has proved a failure. The profitable varieties have all come from the loose, open top type of growth. Not all the varieties of this type have proved profitable, but none have failed to produce fruit. There is doubtless an explanation for these facts which I respectfully submit to strawberry growers present.

Finally, Mr. President, the grower of fancy strawberries must sacrifice something of the grosser element of his business to his ideal. That is, he must be satisfied with a smaller yield of berries; and sometimes, if not always, with a smaller pecuniary reward. His mission is the realization of the beautiful and the best. He takes the little, wayside, wild berry with all its imperfections and transforms it into a thing of marvelous beauty, surpassing in loveliness and delightful qualities the far-famed apple of the gods.

Hence, my friends, the grower of fancy strawberries is an artist and a lover of the beautiful. His fruit is a triumph of the artistic and aesthetic functions of mind. He has given the world new and improved varieties of this splendid fruit. He has broadened, deepened and strengthened the consumptive demand for it and has done more than all others towards giving the strawberry its present supremacy among small fruits.

DISCUSSION.

Discussion led by Mr. J. G. Grossman, Wolcottville.

Mr. Grossman: I think after listening to such a paper that has covered the ground so completely. It is useless for me to make any argument. I agree with him on a great many points. I agree with him especially in

regard to the Warfield being a fine berry, but I did not know it was a strictly fancy berry, although it might be with hill culture. I believe the modified hill or hill system is the only way to grow fancy berries. You can not get fancy berries in a matted row. If we are growing berries on a large scale it is too expensive to use hill culture, yet if we are growing them on a small scale, it is best we can do.

Mr. Garretson: The hill culture was a success with me until this last year. I planted them thirty-two inches each way and tended them thoroughly. I did not have sufficient mulch last winter and the frost divided the tops and roots. I want to know how much to mulch. As to quantity, I had 325 bushels to the acre last year.

Mr. Hobbs: We should certainly mulch enough to keep the plants in the ground.

Mr. Johnson: There is much to commend and little to criticize in the paper, but if I understood the paper on one point, I will have one small criticism to make. He said the larger the better. I disagree with him. I think the larger are not so good as the medium sized berries. He puts the Brunette lower than I would put it. I would not put it first, but I would put it near the top.

Mr. Nelcewander: I do not mean the monstrosity, but I mean the largest size that is consistent with the fancy berry. This, of course, is for the market and not for the table. The Brunette is perhaps the most imposing looking berry, but the flavor is not so good as others. I have tested it by different methods and find it lacks flavor.

Mr. Kingsbury: I would like to ask Mr. Nelcewander's opinion in regard to planting strawberries in the fall. Some growers almost refuse to sell strawberry plants in the fall, as they think the spring is the best time, and for their own reputation they decline to sell in the fall.

Mr. Nelcewander: I have not had much experience in fall planting. I have not had much success in planting in the fall. Doubtless the conditions of the soil would have something to do with it. Soil compacted by rains in winter would not be desirable for fall planting.

Mr. Teas: There are several reasons why it is not best to plant strawberries in the fall. The plant grower can not afford to dig them in the fall. If he digs them in time for the plant to get hold of the soil before winter, he destroys most of his crop of young plants. Nine times out of ten we have severe drouths in the fall that prevent plants from taking hold of the soil. I do not believe there is one case in twenty where the planter saves himself by planting in the fall. Plants cost more in the fall than in the spring and are generally a loss to the planter.

Mr. Hobbs: We have had quite an experience in fall planting and it has always been against it. Very early spring planting has almost always been successful.

Mr. Ragan: Generally speaking, spring is the preferable time for transplanting trees as well as strawberries and small fruits. Fall planting is admissible, but spring is preferable. I endorse his description of the ideal berry even as to the size, with the qualification he gave. There is one point to which the amateur might take exception, but the practical man must admit. That is, a bushel of Ben Davis is better than no Grimes Golden.

Mr. Jesse Stevens: I believe the time has come when this Society could sit down flatly on fall planting of strawberries. I think it is a failure and should be discontinued. In regard to mulching, I have never been able to satisfy myself that straw is the thing. My experience in twenty-five years of strawberry growing is, that the best mulch, taking everything into consideration, is to take our corn fodder and run it through a threshing machine, and then as the ground freezes, mulch the strawberries with it.

Mr. Johnson: If you want to plant largely, plant in the spring, but if you want to only plant a few for domestic use, get your plants started early and plant in August and you will have a crop for the next year. If you are going to plant a great quantity, always plant in the spring. In regard to mulching, I agree with Mr. Stevens entirely.

Professor Troop: Last year I mulched exclusively with corn fodder and it gave excellent results. Don't put it on too thick.

Mr. Henry: In regard to mulching with straw, of course you get a great deal of foul stuff in the ground. The mulch depends on what you are going to do with the patch the next year. It is seldom I keep an old patch. If I have some good varieties and a pretty good crop I generally fix up a few acres of the old patch for the next year. I do that by mowing the ground and after it has laid a few days and a good breeze comes along I touch a match on the north side and burn it clean, then I work the ground like a new patch. I grow in very narrow, matted rows. Last year we plowed and harrowed nine times. The plants came up nicely through August and September and I never had as nice berries as I had on that piece of ground. There are a few "don'ts" that I want to speak about. Don't pay too much attention to highly illustrated catalogues. Don't plant berries you know nothing of. The pistillate varieties make the most money. In planting the pistillate varieties, I plant an early and a late pollinizer on opposite sides. If I am going to plant a block of Warfields, I will plant a Michel's Early on one side and perhaps a Gandy or a Lovett on the other side.

Another thing is, don't pick all your berries to sell. You always have some berries that are not fit to sell. There is where a great many growers make a mistake. If you are going to hold regular customers you can not afford to pick and sell all your berries. You must assort them and throw out some. I always have my berries picked and assorted and fixed as fancy on top as possible. I always aim to put as good berries on the bottom as on top. You will gain by it every time. As far as fancy berries are concerned, the largest berries sell provided the shape is all right.

The next was a paper on—

SMALL FRUITS FOR THE FARMER.

WILLIAM TALBERT. ALBION.

The object of our horticultural societies is not only to advance our financial interest, but to improve our physical, social and moral faculties. Whatever tends to develop the faculties is helpful in building the home. Small fruits are helpful along all these lines. They add health to the body, peace and contentment to the mind, and happiness to the soul. Of all homes, the farmer's ought to abound in all these—small fruits, health of body, peace of mind and joy of soul.

But in passing through the country we notice a great deficiency along the line of small fruit. Many farmers say they have not time to bother with it; that they can buy what they want cheaper than to raise it. But I have observed that those who do not raise it do not have it. Aside from its healthfulness, it is a great luxury. What a pleasure it is to go out and gather the fresh-ripe fruit from your own vines and bushes! First, comes the beautiful and luscious strawberry. Oh, delighted are the children! Then comes the healthful and appetizing currant and gooseberry. Then follows the red and black raspberry in their order, winding up with the blackberry, giving us fresh fruit for about three months in succession. Then let every farmer with all others who have space enough prepare a fruit garden for the home. If it were convenient I would arrange it something after the following order:

A strip of ground ten rods long and four rods wide planted as follows: First, three rows of strawberries four feet apart. Three rows for vegetables same distance apart to alternate with strawberries every two or three years. One row for currants and gooseberries, one row for red raspberries, two rows for black raspberries, and one row for blackberries.

As to varieties of fruit, I would advise something like the following: Strawberries, namely, Haverland, Warfield and Brandywine, with enough Lovett to fertilize the Haverland and Warfield; currants, Fay's prolific;

gooseberry, Downing; red raspberry, Turner, Cuthbert, or Shaffer's Colossal; black raspberry, Souhegan and Ohio; blackberries, Snyder and Taylor. With all these added, the home will be pleasant and attractive and the children will grow up healthy, happy and contented.

Following this was a paper on—

THE EXHIBITION APPLE.

JOE A. BURTON, ORLEANS.

The exhibition apple is a very useful adjunct of society. It pleases, advertises and brings reward to the exhibitor. It gives pleasure to, entertains and instructs the observer. At our fairs there is nothing else that entertains so many visitors as the fruit tables, and the chief feature of these is the apple.

The direct object of the exhibitor is to beat—get the premium. To do this his apples must fulfill the requirements of the premium giver to a larger degree than those of the other fellow, whether these requirements be in accordance with common sense or not. Educationally, apples are exhibited to induce people to grow fine apples. Then this apple should approach perfection as near as possible. The mere fact that it is better than some other apple is a poor recommendation. Both may be, and very often are, bad. Very often at our State Fair we see apples on exhibition that are wormy, scabby and decaying; and what is worse, we see these apples ornamented with a blue ribbon. They would not grade No. 1 in a market barrel. In selecting your apples for exhibition be governed by the following rules:

1. Let them be free from blemishes.
2. Let them be properly colored.
3. Let them be symmetrical.
4. As a climax, be sure they have plenty of size for their kind. But under present rulings, better be careful about this latter point.

Our State Fair, through the instructions of our Horticultural Society, has adopted some arbitrary rules that are more learned than wise; rules that are calculated to detract from the growing and exhibiting of the finest apples. They say a medium, average size apple shall outrank a larger one. John Smith manures, trims, sprays, cultivates and thins that he may have not only smooth, perfect apples, but large ones. Poor John! Your big apples may please yourself, your customers and even bring forth eulogies from the awarding committee, but you can't get a premium.

Now I give this statement once for all, other things being equal, the largest apple should take first award.

Again, we say it must have the stem on. Isn't this an insult when we let the horse pass all right without a tail? The horse's tail is a very useful appendage, but the stem of an apple is of no economical use when parted from the tree. Sprayed apples very often have a russet skin. This should not be considered a defect in exhibitions. It is a fact, though not generally known, that an apple with a russet skin is of better quality than one of the same variety with a smooth skin.

Now, in conclusion, in view of the above statements, would it not be proper to appoint a committee to revise the rules on exhibits and report at the winter meeting.

DISCUSSION.

Discussion led by W. B. Flick, Lawrence.

Mr. Flick: This subject opens a large field for study, covering the whole scheme of exhibitions and agricultural fairs. It is a live and timely subject and deserves our closest consideration. It may begin at the purpose of the exhibition and end with the disposal of the proceeds and remainings. The primary purpose of the exhibition is education. It seeks to inform the general public with regard to varieties, their adaptability to certain regions, the manner of culture, their market value, their value for home use, etc. Fair managers are prone to lose sight of the real or legitimate object sought. They too often are led to pander to the lower tastes of the community and so prepare their lists that they emphasize the ideas of novelty, monstrosity or mere gaudiness. How often does the owner or exhibitor of the fine herd of cattle or horses find himself entirely overshadowed by the three-legged colt or the double-headed calf, or the fruit-grower with the "missing link," or the arrogant and egotistical seedling. I would not find fault with fair managers for doing all they can to draw a crowd in a legitimate manner, but do protest against the emphasis of novelties to the exclusion of the legitimate show.

In the growing and selections of specimens no one has as much power as the maker of the lists except, perhaps, the awarding committee. Whatever points these encourage in their lists and awards will surely be seen in the exhibits. Therefore the list makers should be sure to emphasize the legitimate points. I have never taken any special pains or tried any experiments to grow fruit especially for exhibition. I bring all the resources I can command to grow good marketable fruit and select from these the specimens for exhibition. These should be selected with regard to the points of excellence as given by the premium lists, among the best of which is that issued by our State Board of Agriculture. In making the awards, the committee should give the premiums to the fruit on exhibition and should not encourage the pernicious habit of passing the awards around so that each exhibitor shall have something.

Mr. Morgan: In this part of the country we have come to the conclusion that we can not raise good fruit to exhibit without spraying. I was in hopes that the subject would be fully ventilated. The time has come when we must spray our trees or have no fruit. The most of the fruit on exhibition will show the effects of spraying and some shows that it has not been sprayed. I spray before the bloom, during the bloom and afterward several times. I was traveling in the southern part of Hendricks County not long ago and I came to a new place where the soil was good and rich, and saw gardens and orchards where the insects had not come. As soon as I got near it I felt like I was in another world. I have no doubt, however, but that in a year or two the bugs will find it.

It was moved, seconded and carried that we appoint a committee to revise the rules under which we exhibit horticultural products at the State Fair, to report at the annual meeting.

Professor Troop: I heard Mr. Burton say that the apple stem had no economic value after it had parted from the tree. When the stem is pulled out of the apple, the apple will not keep as long as when the stem is intact. In case of varieties not well known, the stem frequently aids in designating the variety. I claim that the stem should remain in the list of points.

Mrs. Stevens: I don't want the Horticultural Society to hesitate about asking the State Board for anything. They don't know what this Society wants, and what we want is to see that we have some horticulturist who does know, and will say so.

Mr. Johnson: I, with others, was appointed at our last meeting to revise the premium list and go before the State Board. We did so. I took the list to the Secretary and the next thing I knew of the matter he wrote me that he had lost the list and wanted me to make out another. Of course I had to draw on my memory. I did the best I could, but it was imperfect. I went before the State Board and they granted everything I asked. Another thing: I am glad Mr. Morgan suggested spraying. I met a man who is traveling, and he said, "You horticulturists are always having meetings, etc., but we don't have as good fruit as we used to have." I said I thought it was lack of spraying as much as anything. I think this is the most important thing we have to consider.

Mr. Talbott: I would like this subject to be discussed now. I consider it one of the most important subjects that can be discussed. I want to call attention to the suggestion of Mr. Kingsbury of last year, that of getting some young men to study the subject and become professionals in that work. To farmers in general it is too much of a task to fix up and do the work.

Mr. Hobbs: We will not spray before next spring and before that comes our winter meeting, and I will insist that that subject be brought before the meeting. I suggest that we lay it over now, and that some one be appointed to bring the matter before the winter meeting.

The following committee was appointed on the revision of the rules under which we exhibit products at the State Fair:

J. A. Burton, W. B. Flick, Sylvester Johnson.

Then followed a paper—

SOME PHASES OF HORTICULTURE AS SEEN IN A TOUR AROUND THE WORLD.

J. B. BURRIS, CLOVERDALE.

It would be an unwarrantable act to inflict upon this Society a paper proportionate in length to the subject. Since the horticulture of almost every country is a large subject in itself, I can but give hasty glimpses of what was in many instances imperfectly seen, when horticultural phases were oftentimes relegated to more interesting features of sight seeing in a world's tour.

There are few regions on the globe where one would at least expect anything pertaining to horticulture, as in Alaska. When this country was purchased by President Johnson, the dominant party, by way of ridicule, derisively called it Andy Johnson's strawberry patch. Yet along the coast of the many islands adjoining, vegetation grows luxuriantly and during the month of August we found a wonderful crop of salmon berries. The canes grow through the forests in profusion and nearly always produce a crop upon which the bears and Indians feast and both grow fat. The scant population does not warrant a market, and tons ripen and waste annually. The canes and berries resemble, to a great extent, our red raspberry, though shaped like a blackberry.

The horticulture of Hawaii is not nearly so extensive as its floriculture, but the former is susceptible of great development.

One of the most noticeable features of the plant life around Honolulu is the universal growth of Taro, a plant, similar in appearance to the calladium, but having a large bulbous root that is extensively used as food for the natives, the Chinese, and Japanese and some whites. Of this root the famous native dish of poy is largely composed.

Japan is famous for two fruits, plums and persimmons. The latter were in their prime during the month of my visit—October, and were fre-

quently had at the table and cheaply obtained in the markets. The cherry seems to be cultivated in Japan more for its flowers than fruit, and low rows of large trees line the canal banks everywhere, and when in full blossom the whole population turns out en masse for a gala day. The chrysanthemums, for which Japan is famous, were a disappointment. The display during the month when they are at their best was not especially good, for larger and more beautiful specimens are shown at our autumn floral exhibitions.

As we traveled toward the equator in the Orient the vegetation and variety of fruits rapidly increased. Many things new are noted but as a rule the dweller in a temperate clime finds little to admire in these newly-made acquaintances. At Singapore, the metropolis of the Straits Settlements, the wealth and vanity is wonderful. Besides it is a never ending supply. The floral array is astonishing. Little effort is made to use the fruits except in a raw state.

The English capital has been employed in canning and preserving marmalades. At no place in the Orient is there anything like an organized effort in planting, growing and marketing. The small business is in the hands of natives whose methods are crude and who want the energy that characterizes the dweller in less enervating climes.

Ceylon was once famous for its large plantations of coffee and cinnamon, but these have ceased to be a commercial product and their places taken by great areas of tea. Tropical fruit of all kinds are had in abundance, but no attention given to their cultivation. It is a universal fact, that where nature has been so lavish man uses least effort to improve what has been given him. At Kandy, in the interior of Ceylon, is a tropical garden maintained at government expense that is more varied in its collection than any we have ever seen. Nearly two hundred specimens of palms alone are represented, the teeming, congested, starving millions of India, consume but little fruit. Not even in China is the fruit ration so small and inadequate as in India. The mango, tamarind, and species of palm that produce nuts are common, but their product is used only in a limited way.

In Egypt and Palestine, the same disregard is paid to things horticultural. When in Cairo, I attended the first official agricultural fair ever held in the country, and any township in the State could produce a better one, though the valley of the Nile has been farmed since Bible days.

Near Joppa, the principal port of Palestine, a German colony are unsuccessfully growing the orange, and will soon add grapes. The only fruit given attention about the sterile regions of Jerusalem is the olive, and the groves are small and neglected. Its extreme hardiness finds favor with such careless cultivators.

Syria is in notable contrast to other portions of Turkey. The whole country about Damascus appears like one vast garden and orchard. Nearly all the tropical, semi-tropical fruits and those known to a temperate re-

gion are produced. The country is splendidly watered by streams running down from the Lebanon hills. Much attention is given to silk-worm culture, and extensive groves of mulberry trees are noted. The trees are cut back each year and only leaves grown on new branches are used.

About Constantinople there are many fine orchards of tropical and semi-tropical fruits, but they are usually the pleasure grounds of the wealthy Turks and are not cultivated for profit. Whatever the Turk touches he blights, until he has well merited the title of renegade nation.

The south of Africa has long been famous for its lemons, the chief horticultural product. One is continually treated to surprises and wonders at the great amount of labor that has been expended to terrace the steep and barren hillsides, making retaining walls and then bringing earth to support the trees. No more beautiful sight could be imagined than these once rocked cliffs, covered with yellow fruit. I doubt if there is a grander drive in all the world than around the bay of Naples to Salerno. All Italy is steeped in wine, for the grape is cultivated in nearly all portions except the extreme south.

Much of Spain is too cold to grow fruits and the Spaniard is too indolent to exert himself to produce anything else. In the region about Seville, the heart of Moorish Spain, the orange grows to perfection. Grapes are cultivated and wine of a peculiar taste produced. To the southward along the coast Malaga grapes are produced in quantities and find their way to our markets.

Southern France is the garden of Europe. Nowhere else in all the continent does one see so much neatness and evidence of thrift. Not only does the French peasant have an eye to business, but to beauty as well. His orchards and vineyards show evidence of good tillage and careful attention. No large areas are devoted to orchards, but the aggregate amount must be enormous. The grape still outranks all else in proportion, for French wines outrank all others in purity and excellence. If France is the garden of Europe, Switzerland is its playground. Where nature is in its wildest mood man has tried to obtain a foothold and planted the steep hillsides with vines. None can help admiring the plucky Swiss, a combination of Italian, French and German.

In Germany and Austria the same climatic conditions exist as in our own State. Every available bit of ground suitable for cultivation is used. One sees long rows of apple trees planted along the unfenced roadways. Upon inquiry I found that these fruit trees were the property of the persons owning the land adjoining the road. The practice is one that in time will obtain here, but at present with our vast areas suitable for cultivation we are not so restricted. In years to come a teeming population will demand the utilization of all our vast domain.

Russia and the Scandinavian peninsula are, for the most part, restricted in fruit growing by the severity of their climate. The sands of Holland and Belgium are not adapted to fruits. The inhabitants of the

former are largely engaged in dairying and growing bulbs. The latter have reached an advancement in agriculture perhaps unequaled by any other of Europe. In England one rarely sees a large apple orchard, and I don't recall seeing any peach trees. The best fruit region, I was told, was the north central region. No doubt the excessive moisture of the south coast and Scotland is detrimental to fruit growing.

After admiring the Japanese gardener, the tasteful Frenchman among his vines, or the patient plodding Austrian, one can come to only this conclusion. To succeed, we must exercise greater care; care in selection; care in cultivation; care in our war on insect pests. With worn soils, few modern tools and the most laborious methods they succeed while we oftentimes fail.

DISCUSSION

Mr. Hale: Were the apples similar to ours?

Mr. Burris: I think those of Austria are better than those grown here. At least in appearance. In England, most of the apples consumed are foreign grown.

Mr. Teas: I think the apples grown in France, Germany and Austria are grown more for cider to mix with their wines than anything else.

Mr. Kingsbury: What about Russia?

Mr. Burris: Russia is the most disagreeable country to travel in. With the exception of Turkey it is the only country in the world that demands a passport every time you go in or out of a city. You have to go to the American consul and get a passport. When you arrive at a city you are taken in charge by the police, and you have to identify yourself, tell them when you arrived, how long you expect to stay, when you will leave. I was disgusted with it.

Committee on Awards reported, and the report was adopted.

REPORT OF AWARDING COMMITTEE.

	<i>First.</i>	<i>Second.</i>	<i>Third.</i>
Plate Malden Blush—			
Walter Ratliff	\$0 75	.....	.....
John Morgan		\$0 50	.....
Plate Wealthy—			
Walter Ratliff	\$0 75	.....	.....
Mrs. De Vilbiss.....		\$0 50	.....
Plate Benoni—			
Walter Ratliff	\$0 75	.....	.....

	<i>First.</i>	<i>Second.</i>	<i>Third.</i>
Plate Chanango—			
H. J. Hale	\$0 75	.....	.....
Plate August Variety—			
Walter Ratliff	\$0 75	.....	.....
H. J. Hale		\$0 50	.....
Plate Duchess—			
D. M. Carter	\$0 75	.....	.....
Isaac B. Jones		\$0 50	.....
Best Display of Apples—			
Walter Ratliff	\$3 00	.....	.....
Mrs. De Vilbiss		\$2 00	.....
Isaac B. Jones.....		.....	\$1 00
Best Display of Pears—			
Walter Ratliff	\$3 00	.....	.....
D. M. Carter		\$2 00	.....
Mrs. De Vilbiss .....		.....	\$1 00
Best Plate August Variety of Pears—			
Walter Ratliff	\$0 75	.....	.....
W. B. Flick		\$0 50	.....
Best Display Peaches—			
Mrs. De Vilbiss	\$3 00	.....	.....
Best Plate Freestones—			
L. C. Kline	\$0 75	.....	.....
J. C. Grossman		\$0 50	.....
Best Display Plums—			
L. C. Kline	\$3 00	.....	.....
D. M. Carter		\$2 00	.....
Mrs. De Vilbiss.....		.....	\$1 00
Best Plate August Variety Plums—			
L. C. Kline	\$0 75	.....	.....
D. M. Carter		\$0 50	.....
L. C. Kline.....		.....	\$0 25
Best Display Plants and Flowers—			
Mrs. W. B. Flick.....	\$2 00	.....	.....
Mrs. H. J. Hale.....		.....	\$1 00
Best Display Vegetables—			
E. B. Davis.....	\$3 00	.....	.....

E. Y. TEAS,
H. W. HENRY,
MRS. W. W. STEVENS,
Committee.

The Committee on Resolutions reported as follows:

Resolved, That we, the members of the Indiana Horticultural Society, thank the Friends for the use of the church and this beautiful grove, a fitting place to hold a horticultural meeting. The placing of a church in large grounds and the planting of a grove of trees around it like nature is a novel idea and should be an inspiration to every member present to not cease working until every rural church, schoolhouse and country home has its share of ground, trees and beauty.

Resolved, That we thank the local Society and people of Plainfield for their hospitality and generosity in entertaining us and making our stay in their village pleasant and one long to be remembered.

Resolved, That we thank Professor Charlton for the pleasure of a visit to the Reform School, and his kindness in answering questions and showing us around the beautiful home for the unfortunate boys of our State.

Whereas, Indiana is a great agricultural State and is destined to become a greater one. The density of its population will make it a country of small farms and intense cultivation; therefore,

Resolved, That we ask the Legislature for the necessary appropriation to make Purdue University one of the first and best agricultural colleges in the land, and that we recommend greater facilities for the education of the farmers' daughters.

Owing to the constantly increasing depredations of insects and the impossibility of producing perfect fruit on that account,

Resolved, That we recommend the profession of spraying to our young farmers and fruit growers, as one that is destined to be a profitable one when once established.

J. G. KINGSBURY,
NAOMI DEVILBISS,
MRS. J. TROOP,

Committee.

Report of the committee was accepted.

Mr. W. H. Ragan was called on to make a few remarks, and spoke as follows:

I am not in very good condition to speak, but I feel honored by this invitation. I have traveled nearly 1,000 miles to be with you. I was anxious to be with you this time. The meeting with old friends and comrades and the ozone in this atmosphere has revived me after the heat of Washington. I am glad to be with you after sixteen months' absence. I was called there, as I supposed, temporarily, but I have been held and reappointed and advanced in pay once or twice, and I am now under obligation to return as soon as my health will justify.

I will say a few words as to what I am doing there. The government has done but little directly in the interest of pomology. The establishing of a division of pomology probably emanated from an adjoining room to

mine at New Orleans in 1885. It resulted in Mr. Coleman being appointed Secretary of Agriculture and the establishment of this new division. The growth has been slow and the development has been by approaches, as there was no organization and no regular system of work. Colonel Brackett is now in Paris in charge of the pomological exhibit at the World's Fair. The work I went there to do was to make a revision of the catalogue of fruits. I supposed that after that I would return home, but my work has been somewhat general since that. I have had considerable to do with gathering the exhibit for Paris. In the meantime the permanent work I have been doing is a card list or index of fruit on which is the name of the leading variety. The policy of the division is the simplification of our nomenclature. First the agreement of the name. I think the green gage plum has forty-nine synonyms. Our policy is to simplify this and adopt one name under which the fruit should be known everywhere. These cards are all arranged in drawers in alphabetical order so you can easily find them. I have already had 2,000 names of plums, and think we will reach that number of grapes. An inquiry at the division of pomology can be answered in a few moments. It is a permanent work and will result in the simplification and systematic understanding of the fruit nomenclature and it is contemplated to publish this in form to be distributed. The most recent publication is one on the apple by Colonel Brackett, and is known as Bulletin No. 113. If you wish for a catalogue of fruits you can get it by asking for Bulletin No. 8.

After adjournment, many of the members of the Society availed themselves of the invitation extended to them by Messrs. Albertson & Hobbs to visit their nurseries at Bridgeport, which is five miles east of Plainfield. Here they were shown through the two hundred acres of nursery stock, and given something of an idea of the extent of and system which prevails in a modern nursery.

PROCEEDINGS
OF THE
FORTIETH ANNUAL MEETING
OF THE
Indiana Horticultural Society,

HELD AT THE STATE HOUSE, INDIANAPOLIS, IND.,

DECEMBER 18, 19 AND 20, 1900.

The fortieth annual meeting of the Indiana State Horticultural Society met in the rooms of the State Board of Agriculture in the State House, Tuesday, December 18, at 1:30 o'clock. The meeting was called to order by the President, C. M. Hobbs, who delivered the President's address, as follows:

PRESIDENT'S ADDRESS.

We are met in the fortieth annual meeting of this Society. Another year has passed with its successes and failures, and its lessons for the future. After the past year's experiences and observations, I am fully convinced that if we are to succeed in our calling we shall have to more intelligently and energetically apply the principles of modern science in our operations. We shall have, in the light of science, to study the nature of soils as to plant food and the adaptation of varieties to soils and situations.

We must learn that it is not enough to simply procure and plant the tree, but that it must have intelligent and timely care. With our increasing dry, hot summers, we are compelled to study and apply the principles of the conservation of moisture. With the increasing destruction by in-

sects and fungus diseases, we are compelled to know more of insect life and parasitic growth and the most successful methods of combating them. The sluggard can not succeed in horticulture; success in the future can only follow intelligent, timely, energetic effort.

If, by selecting varieties adapted to climate, soil and situation, by supplying all the plant food required, and by thorough cultivation, we secure the proper mechanical condition of soil and conservation of moisture; if, by the timely and proper use of the sprayer we preserve tree and fruit in healthful condition, and by properly thinning the fruit preserve the highest possible vital energy of tree and plant, we shall generally succeed. If these conditions were properly met, I am confident that our State would produce hundreds of bushels of fruit where one is now produced.

We have a few illustrations in our own State of the benefits derived from the application of these principles; but the most striking example of intelligent, successful fruit growing that has come under my observation is that of Mr. Morrill, of Benton Harbor, Mich. Mr. Morrill not only has up-to-date ideas about fruit growing, but he puts them in practice. By thorough cultivation, fertilizing, pruning, spraying and thinning the fruit he is able to secure the ideal tree; or, in other words, to build up and maintain the highest possible vital energy of the trees.

Two years ago, following the severe winter, the wisdom of his methods was clearly proven. Peach trees that were cared for in the usual way were severely injured by the winter, and many were killed outright. There were few peaches anywhere that year. Mr. Morrill's trees, on account of their superior vitality, came through the severe winter with little or no injury, bore a full crop of fine fruit that brought fancy prices on account of the general shortage in the crop.

Mr. Morrill finds it pays him well to spare no pains or expense in producing the best possible tree. I have used this illustration to show particularly that if we are to succeed in fruit growing in Indiana we shall have to employ different methods from those of the past, we shall have to invest more in the care of the trees and plants.

We hope to be able to show in the experimental orchard of this Society some of the results of the most approved methods of orcharding. We also expect to be able, through hybridizing and selection, to make some valuable additions to our list of good apples. We have every reason to believe that this undertaking will, in a few years, result in great benefit to the State.

This Society has a great work before it through its meetings, published proceedings, local organizations, etc., in disseminating needed information and in building up the horticultural interests of the State. Neighboring States are advancing much more rapidly along these lines, and it is to be hoped that the coming Legislature will properly appreciate the great importance of this work to the State and make an appropriation commensurate with its importance.

The State of New York has, in recent years, made very liberal appropriations, and has by this means greatly improved the horticultural conditions of the State. The results have been so satisfactory that Professor Bailey says that they do not now have to ask for an appropriation, but it is one that the Legislature seems glad to give. It is clearly to the interest of the State to look carefully after the State's productive resources, as these are its chief sources of wealth.

The San Jose Scale.—This dangerous pest has been found in seventeen counties of the State. The worst infected localities are in the southwest part of Indianapolis, and in Vanderburgh County near Evansville. Twenty-five or thirty cases have been found in Vanderburgh County, and there are probably as many in this city. This Society did a good work for the State when it framed and secured the passage of a noxious insect law; and Governor Mount did the State a good service when he appointed Professor Troop State Entomologist to enforce the law.

With the aid of the law, the entomologist has been able to stamp out the San Jose scale in five counties of the State, and in a number of localities in other counties. The entomologist finds he can not get over the State and do the work as it should be done with the present appropriation of \$1,000; he thinks with \$1,500 the work could be quite thoroughly done. It is to be hoped the coming Legislature will increase the appropriation to \$1,500.

So far as the scale is concerned, we feel that it is well under control, and that by watchfulness, prompt and vigorous action, we will in time be able to rid the State of this dangerous enemy to trees and plants. The law has been of great assistance in suppressing the canker worm, black knots and other enemies of trees and plants.

I would like again to call the attention of this Society to the importance of the subject of forestry in our State. We should continue to keep this subject before the people and urge its importance until all the waste places shall be made glad with stately trees, running brooks and singing birds.

In the past few years we have so frequently been shocked at the wanton butchery in the trimming of shade trees that we feel it our duty to cry out against this abuse of the noble trees. The soft maple is the most frequent sufferer probably, but no varieties are spared. This butcher begins his work with but one idea in his head, and that is to lop off all the branches just as near to the body of the tree as possible, regardless of the size of the tree.

In a certain village in this State, there was a row of fine soft maples, 16 to 18 inches in diameter, and with a fine spread of branches. In the month of August, the owner had all the branches cut off within four to six feet of the body of the trees. As a result of removing nearly all the foliage at this time of year, the trees were greatly shocked and came near dying; all the stubs of branches left sun-scalded from exposure to the di-

rect rays of the sun, and as a result these branches are dead one-half to two-thirds round.

Another illustration: Three or four large soft maples lined the sidewalk in front of the residence, with a fine specimen of native elm at the end of the row. I never passed this place, but I admired this fine elm, stretching out its long sinewy branches as though bent on protecting everything within the possible reach of its generous arms.

One day, to my surprise and pain, I saw the tree butcher had gotten in his work. Those trees that had added so much to the attractiveness and comfort of the place had been reduced to mere stubs, and the proprietor has had the pleasure of basking in uninterrupted sunshine, and will continue to enjoy this privilege for some time to come.

Soft, brash-wooded trees, like the soft or silver maple, should have their branches shortened in some every year or when growing rapidly, in order to give sturdiness to the limbs and compactness to the top. If this is done every two or three years for a few years, the individuality of the tree can be preserved to a great extent, it will always be sufficiently compact and symmetrical in top, and strong enough to withstand the sleet and storms. By this method no great amount of wood is removed at any time, the tree is not shocked by severe pruning, and is more likely to be kept in healthy, vigorous growth.

If the maple family of trees is trimmed about the time the buds burst into foliage, there will be no bleeding or loss of sap. Our elms, hard maples, ash, lynn, liquid amber, etc., rarely need any pruning if properly shaped. Let us do some missionary work along the line of tree planting, and see if we can not improve the present conditions.

I trust that we will make this the most interesting and profitable meeting we have ever held.

The report of the Secretary, James Troop, was made as follows:

REPORT OF THE SECRETARY.

FINANCIAL STATEMENT.

The following is a statement of the financial transactions for the fiscal year ending October 31, 1900. With this is submitted a list of vouchers and a summary of all moneys collected and paid into the hands of the Treasurer, with warrants drawn on that officer for the corresponding period:

Summary of the Receipts for the Year Ending October 31, 1900.

Balance due from Secretary, 1899.....	\$12 39
Received for membership fees.....	80 50
Balance due the Secretary October 31, 1900.....	6 95
Total	<hr/> \$99 84

Summary of Credits.

Paid for stationery and printing.....	\$19 75
Paid for freight and express.....	13 90
Paid for postage and postal cards.....	43 80
Paid for traveling expenses.....	8 50
Paid for telegrams.....	2 64
Paid for wrapping paper for Buffalo exhibits.....	11 25
Total	\$99 84

Account With the Treasurer.

To balance on hand November 1, 1899.....	\$1,165 10
To cash received from the Secretary as membership fees.....	80 50
To cash received from Secretary, balance from last year.....	12 39
Total	\$1,257 99
He has paid warrants 332 to 362, inclusive.....	906 17
Balance in the treasury November 1, 1900.....	\$351 82

Following is a list of warrants drawn on the Treasurer for the fiscal year ending October 31, 1900:

1900.

Jan. 3.	Warrant No. 332, Miss Flora Chizum, stenographer....	\$20 00
" 4.	Warrant No. 333, S. Johnson, to pay premiums.....	65 50
" 4.	Warrant No. 334, Joe A. Burton, expenses at Board meeting	7 50
" 4.	Warrant No. 335, R. Morrell, expenses and services at annual meeting	12 00
" 4.	Warrant No. 336, Mrs. W. W. Stevens, expenses at Board meeting	4 95
" 4.	Warrant No. 337, Snead Thomas, expenses at Board meeting	8 25
" 4.	Warrant No. 338, E. Y. Teas, services as entry clerk....	5 00
" 4.	Warrant No. 339, E. Y. Teas, expenses attending Board meeting	6 25
" 4.	Warrant No. 340, J. Troop, hotel and other expenses as Secretary	14 00
" 4.	Warrant No. 341, C. M. Hobbs, expenses at Board meeting	5 00
" 4.	Warrant No. 342, J. C. Stevens, expenses at Board meeting	7 85
" 4.	Warrant No. 343, S. Johnson, services as Treasurer....	10 00
" 4.	Warrant No. 344, C. M. Hobbs, services as President....	10 00

		1900.
Apr. 6.	Warrant No. 345, J. Troop, Secretary, on salary.....	150 00
May 17.	Warrant No. 346, Wm. B. Burford, printing annual report	240 73
Aug. 17.	Warrant No. 347, J. C. Grossman, expense at Board meeting	11 00
" 17.	Warrant No. 348, Geo. P. Campbell, expenses at Board meeting	4 25
" 17.	Warrant No. 349, Mrs. W. W. Stevens, expenses at Board meeting	10 50
" 17.	Warrant No. 350, L. B. Custer, expenses at Board meeting	6 50
" 17.	Warrant No. 351, E. Y. Teas, expenses at Board meeting	4 75
" 17.	Warrant No. 352, Amos Garretson, expense at Board meeting	3 50
" 17.	Warrant No. 353, S. Johnson, expense as Treasurer....	1 50
" 17.	Warrant No. 354, J. C. Stevens, expense at Board meeting	10 00
" 17.	Warrant No. 355, J. Troop, expense at Board meeting..	9 25
" 17.	Warrant No. 356, Flora Chizum, stenographer.....	15 00
" 17.	Warrant No. 357, Joe A. Burton, expenses as Superintendent of experimental orchard.....	20 50
" 17.	Warrant No. 358, C. M. Hobbs, expense at Board meeting	2 00
" 17.	Warrant No. 359, J. Troop, balance of salary as Secretary	100 00
" 17.	Warrant No. 360, S. Johnson, to pay premiums.....	38 00
Sept. 20.	Warrant No. 361, S. Johnson, to pay expense of Executive Committee	9 50
Oct. 31.	Warrant No. 362, J. Troop, Secretary, for office expenses	92 89
	Total	\$906 17
	Balance in treasury October 31; 1900.....	351 82

Supplemental Report.

To amount paid out between November 1 and December 31, 1900, including premiums paid and expenses of officers and speakers from other States at annual meeting.....	\$273 35
Balance in the treasury December 31, 1900.....	\$78 47

The report of the Treasurer, Sylvester Johnson, of Irvington, then followed:

TREASURER'S REPORT.

Report of the Treasurer of the Indiana Horticultural Society for the fiscal year ending October 31, 1900:

Debits.

October 31, 1899. Balance in treasury at last report.....	\$1,165 10
October 31, 1900. Received from Secretary membership fees of 1899	12 39
October 31, 1900. Received from Secretary membership fees of 1900	80 50
Total	\$1,257 99

Credits.

October 31, 1900. Paid on warrants Nos. 332 to 362, inclusive...	\$906 17
October 31, 1900. Balance in treasury.....	351 82
Total	\$1,257 99

Supplemental Report, December 31, 1900.

Balance on hand November 1, 1900.....	\$351 82
Paid warrants Nos. 1 to 18, inclusive.....	273 35
Balance on hand December 31, 1900.....	\$78 47

Respectfully submitted,
 SYLVESTER JOHNSON,
 Treasurer.

On motion, the report of the Secretary and the report of the Treasurer were each referred to the Committee on Finance.

REPORT OF THE SUPERINTENDENT OF THE EXPERIMENTAL ORCHARD.

JOE A. BURTON, ORLEANS.

The growth of trees planted in the spring of 1899 has been very fine. Their cultivation was with the spading harrow. Three cultivations were given, ending the middle of June. At last cultivation one bushel of cow peas per acre were sown. These made a fine yield, both of stalk and pod. A part were mown for hay and the rest left standing. The attempt to hog down has failed up to the present.

Four trees of top workers were grafted with scions from North Carolina bearing the following names: "Hoover," "Yellow Pippin," "Never Fail," and "Nansemon;" one tree with "Obediah," from John Morgan, Danville; one tree with "Genet," and one with "Rambo," from trees bearing very diverse specimens, to test the variations of varieties. Incidental to the orchard, we have grafted different varieties on a wild crab not in the orchard, to test the influence of the tree sap on the fruit. It is proposed to grow these apples without any leaves of their own.

In crop pollenizing we have for two years failed to find pollen on Winesap. Large sections of blossoms inclosed by cheesecloth set no fruit. We infer that this was not on account of absence of insects, as "Rome Beauty" inclosed in paper sacks set fruit all right.

We failed to secure any pedigree seeds this year. On account of sick neighbors we could not cross pollenize many. Prof. R. H. Troth, of Orleans, kindly assisted me one day. For various reasons our labor was lost. This is a very tedious operation and requires much patience. We have saved a few selected seeds; one lot from a large white apple, name unknown, grown in North Carolina. When about half decayed this apple weighed 21 ounces and was of fair quality.

Apple seeds planted in 1900, 9,000; resulting scions, 989; height of scions, 1 to 48 inches; variety germinating largest per cent., Winesap; variety making largest growth, Ben Davis. Ben Davis maintains its fine root system, Winesap its scant root system. Number of pedigree trees, three. They are Genet pollenated by Ben Davis.

We have selected for top grafting the most promising of—

Ben Davis	12
Rome Beauty	14
Winesap	19
Grimes	2
Salome	2

Expenses for the year:

Cow peas (10 bushels).....	\$17 00
Grubbing stumps	3 50

Things badly needed for the orchard:

1. Rabbit-proof fence.
2. Zinc labels.
3. Pamunkey phosphate to prevent root rot.

DISCUSSION.

The President: What do you know about the efficacy of phosphate as a preventive of root rot?

Mr. Burton: I couldn't say positively it will prevent it. I put some phosphate around the roots of a tree about the middle of the summer. The leaves were getting green on that tree, and where the roots were not already dead, the roots healed up. The next season Professor Huston furnished me about one hundred and fifty pounds. I placed that around a number of Grimes trees. I examined a large part of these and found, as far as I examined, they were all healed up but one tree. These are indications which are pretty strong. Those trees have not died, but got well and are growing nicely now.

The President: The strong probabilities are that it is a fungi, and that you didn't get all these effects simply from the application of the plant food. Where the ground is strong enough the trees will grow thrifty enough.

Mr. Burton: Where I applied it to trees to see what effect it would have on the fruit, I couldn't see any effect. I think it has its effect on the fungi.

Mr. Henby: I would like to know if this is a difficulty that is general in the State—if it is a common disease in orchards? We are strangers to anything of the kind in our neighborhood. I never heard of anything of the kind this side of the Illinois State line before.

The President: Some trees are particularly susceptible to root rot, and Grimes is particularly so. In the southern part of the State they have quite a good deal of root rot. Some localities are worse than others.

Mr. Thomas, of Grant County: Last week we had our Annual Farmers' Institute at Marion, and there was a gentleman from Fairmount, twelve miles south of Marion, who called my attention to it. He said in his orchards it was very bad, and he asked me if I knew anything about it or any remedy, and I told him I had heard of it, but as to any remedy I

knew nothing about it at all. I was driving a few days ago in the north-west part of our county, and I saw many apple trees probably twenty years old which showed they had rotted off almost to the top of the ground and had fallen over. I said at the time that those trees were affected by root rot. I know nothing further than what I have learned or observed in this way.

Mr. Reed, of Vincennes: We are troubled about Vincennes to some extent, but not very bad, with root rot. I was in Missouri week before last and they have it very bad there; and Prof. Herrman Von Schrenk, of the Missouri Botanical Garden, gave quite an interesting lecture, and showed specimens which were badly affected, and said that trees had died in orchards there after being planted four or five years, and he did not seem to know any remedy. There was a man by the name of Wilkinson somewhere along the Mississippi River that experimented for the last two or three years with concentrated lye. He has been using it quite extensively, getting it by the ton. I think he used three tons last season, and his plan was to clean away around the tree and pour a strong solution of this concentrated lye around the roots, and where he has done this the trees have improved in growth and it has seemed to stop the ravages of the root rot.

The President: It has always been my theory that some sort of potash ought to arrest it. I know that Professor Huston is looking after this matter. I am glad to hear the report Mr. Burton makes with reference to it.

Mr. Henby: Are all classes of fruit trees affected?

Mr. Burton: In my orchard it affected the Genets and Winesaps.

Mr. Henby: How about cherries, pears and plums?

Mr. Burton: I couldn't say. I have not planted any pear trees where apple trees grew. I have planted them eight feet and three inches on each side. Last summer I lost two or three pear trees and they died in full leaf. I don't know what was the matter. It affects all kinds of apples. It has no respect for the leaf of the tree and it affects the thrifty tree as well as the weak. I used a carload of ashes at your suggestion, Mr. President, and there have not a great many died where we applied that, but some have. I have shown apples and got premiums on them at this Society and at the State Fair that were off of trees that died and rotted off before cold weather.

Mr. Davis: I would like to ask Mr. Burton if the cow peas are sufficient protection for the ground in winter?

Mr. Burton: I would suggest that if a gentleman would walk through them he would think they were enough for protection during the winter. We don't try to mow them very close. They will make all the vegetation we need in the winter and be there in the spring and keep a kind of mulch on the ground.

Mr. Tilson: Does the root rot in your locality affect all the trees alike?

Mr. Burton: If it attacks any of them more than others, it seems to attack the Grimes heavier than anything else.

Mr. Tilson: In our locality that is the only apple affected. In our orchards we have lost all of our Grimes before they became three years old. It did not affect the White Pippin at all. It grows up thirty or forty feet high. I have now four Grimes' Golden which I believe now are going to make it. I set those out with a half bushel of oats and a bushel of ashes in the hole that I dug, and they are not affected so far. They are now three years old. I told the President two years ago that it might be a good plan to graft Grimes' Golden on White Pippin, for they seem to stand anything with us.

Mr. Burton: It is quite likely that Mr. Tilson is troubled with what I term Grimes' bark disease. It is very much subject to bark disease which affects it at the ground or a little above it. I don't know of any other tree so affected, and I find some localities where we can't have the Grimes.

OUR NEEDS FOR THE FUTURE.

GEN. JOHN COBURN, INDIANAPOLIS.

I think public effort ought to be made in the way of legislation. This Society and its interests and interests of horticulture in this State has had very little from the State—not so much as I think they ought to have, when we consider that the agricultural and horticultural interests of Indiana are of prime importance. Greater profit and greater advantages are to be gained by the furtherance of these two great industries than by all else combined. While we have great coal and oil fields and gas fields and forests, yet we are peculiarly an agricultural State. I do not know but what we might claim to be the very head of the list as an agricultural and horticultural State, considering the situation of the State and the condition of our soil. We might especially claim to be the greatest agricultural State in the Union in proportion to our size. Of course

Illinois is ahead of us by reason of a greater extent of territory, and so is Iowa, but taking Indiana all in all for what it is I think we stand very nearly at the head of the list. I want to talk to you a little while on the subject of horticulture. I haven't very much time, but I wish to speak a few words in regard to some proposed legislation in the interests of agriculture and horticulture. Our State Fair is a great thing, but it is largely a live stock fair. There is no objection to the State Fair, but if Indiana progresses as it ought to as an agricultural State it seems that we will have to depend somewhat on the aid of the State. There should be in every county some kind of an agricultural station. The people could afford to have such a thing; they could afford to buy the land and inclose it and set it out with plants and trees and shrubbery and whatever is necessary to constitute a horticultural establishment. They will never do that voluntarily—I mean under the form of a mere voluntary association. Such a project might as well be given up in despair in advance; it can not be done. Only a few men would take an interest in it. But there is another way it can be done and should be done, and that is through legislation. It may not be done in every county. It may be done in a few counties where there is more public spirit than in others. The project I am in favor of is this: To have an act of the Legislature authorizing County Commissioners to levy a small tax for the benefit of this project. For instance, here in Marion County. We want to have a horticultural station. It would have to be located somewhere out in the country. Connected with that I have also provided, or thought it should be provided, in the bill a means for the erection of public buildings for public assemblages. Here in Indianapolis we have plenty of buildings in which to hold public assemblages of an ordinary size, but for assemblages of an extraordinary size the people of Marion County and of the State can not be protected under roof from water or wind or rain or cold. It is not the business of the State, it strikes me, to levy taxes for the erection of buildings or to make the State officers responsible for the care of anything of that kind. So whatever I say contemplates county action. My plan is to authorize Boards of Commissioners to levy a tax for horticultural gardens, for experimental stations, and whatever buildings and greenhouses or what not that may be connected with them. The bill then I would suggest to the Legislature would be of larger effect than that even, and should provide also that they could go on after awhile and erect buildings out of this fund for public meetings. The people of the country are entitled to the best there is, and never get it. When the people in the country come into town and there is a great meeting or any important question they have to stand out in the sunshine or dust or wind or cold or rain, and they are never comfortable, particularly the women. If the Legislature would authorize the levy of the tax I have mentioned then every county would build a great public assembly hall, and that would be a great addition to the needs of the

people. But I must not ramble. Now we could not expect to raise enough in the first year or two years or four years to do anything of very great importance, but we could make a beginning, and this tax kept up from year to year for ten or fifteen or twenty years would accumulate a great sum so that almost anything even beyond our highest expectations could be obtained. The right way, it strikes me, is to begin with the horticultural garden and in some place where land does not cost too much. However, it ought not to be too far from public inspection. It ought to be near enough to the county seat so that the people of the county could see it and so everybody would become interested in it. Locations could probably be found near to the county seats. We need public gardens and nurseries very much. We need places where experiments can be carried on properly. Our friend Burton is doing a great work, but the kind of work he is doing ought to be in almost every county in the State. How can this need be supplied except by a general contribution from the public? It can not be done by taking up subscriptions, because people are worn out with contributions. There must be some percentage of profit or something of that kind or men will not, as a general thing, go into anything of the kind. I would despair at once if the business was to go on upon the basis of contributions. A public hall at the county seat will be, to a certain extent, a source of revenue also. It would not be an expense and a loss entirely. Take one of our number of county seats such as Richmond, or Greencastle, or Terre Haute, or Franklin, or Connersville, or Peru, or Logansport, and a public hall there would pay for itself. Lectures and shows and a thousand kinds of meetings would assemble there, and that, it seems to me, should carry weight enough for the Legislature to authorize the passage of a law of this kind. Of course there is nothing compulsory in this. It is to be entirely discretionary with the County Commissioners as to how far they should go and what they shall provide for. But I would make a law broad enough so as to include not only horticultural gardens, but everything which might inure to the benefit of the people as the public assembly hall. Why, here in Indianapolis every year we have a great number of meetings where there are no accommodations at all for a great mass of people. When the Methodists met here last year they had to put up tents in the court house yard, and yet the people could not get in, and when candidates for president and vice-president come here during political campaigns there is no place for them to go except to stand out in the wind or sunshine. There is some accommodation at the State Fair, but the people are scattered. There is no one hall there which will hold the people. In most of the flourishing county seats there is not the accommodations there ought to be, but people can go and receive instruction by lectures, speeches and sermons. The need of places to hold these assemblages is bound to become more and more trying as the years go on. The use of electric lines will make it possible for people to come a distance to the county seat. I

mental station in the different counties, but I am in favor of the Legislature giving us authority, or our commissioners authority, or the authorities of State authority, to go through the different school districts of the State, county and township and lecture the rising generation on the best methods of raising fruit and the importance of protecting the birds that protect the fruit, and also the importance of causing the waste places in our State to produce—not the original forests—but to produce trees sufficiently dense and desirable for the home of the birds that destroy the insects that destroy the fruits. I think the most thorough way we can get at the mischief-makers and destroy them is by educating the rising generation up to the view that it is wrong to destroy the birds, and it would be a proper thing to educate them to do different from what they are doing now. As you and I now know it is a very common thing to see some half-grown boys running through the country with their guns destroying the birds that protect the fruit. I am further in favor that it shall be punishable by fine and imprisonment to destroy the birds of the forest, and also that those who destroy your fruit in your orchard, as they are in the habit of doing, that there should be some punishment for that. I am still further in favor of legislation in giving police powers to supervisors, or if not to them, to a special policeman in every mile square that is adjacent to some large city. I have two large orchards and one of them is within a mile of the corporation. It is no difference how much time and money I spend on that orchard, I only get to see the bloom and the green fruit. This experimental orchard is in the line of Brother Coburn's remarks, and my own sentiments in particular. I think we have got to raise new varieties from the seedling. That is what we will have to do. I hope there is a better way because that is very uncertain, but the good varieties we have have come that way as a rule. It is a very little matter for a man to plant a thousand apple seed and let them go to bearing, and in doing that he might do a vast amount of good to the whole world if he produces an apple superior to the kind of apple we have now. I don't know how a man could do more good in a material way than to plant apple seeds, looking forward to their bringing forth something that would be a blessing to the world. I think there should be a premium offered to any one that would produce a better apple than we have at the present time. I think he should be well paid, because if he succeeds in doing that he has done a great work. If an appropriation is made for an experimental farm in the different counties, of course that is a great work if it is carried on right. These apples that are exhibited here are beautiful, and the important question is how can we raise such apples? Of course we have troubles which we did not have fifty years ago. An important thing, of course, is the selection of a locality. I have one orchard on clay ground and another on second bottom, sandy loam. The orchard on the sandy loam has been pretty well taken care of. It has been cultivated and fertilized, while the orchard on the clay ground has been

neglected. Still the orchard on the clay ground produces one hundred bushels of apples where the other does ten to the same amount of trees. Now what is the difference? There must be some difference in the ground or the locality. We want to investigate all these things. We want to know what the reason is. My own notion is that it is the location of the orchard and the soil perhaps. It might be shown that there is some other reason and perhaps a good reason for this difference in the two orchards. Of course experiments along this line will enable us to come to the conclusion as to whether it is the soil or the locality that produces the apples. That is one of the needs of the future that we find out these things for ourselves. I want to speak once more about legislation, and I hope the members of this Society will take an interest in this thing. There is no trouble about the agricultural and horticultural elements of the State of Indiana getting what they want if they will all go to work for it. If we don't get it it is because of our neglect. You will notice the game and fish law. The sportsmen got up the bill and it suits them, and they are enthusiastic over it. It gives them all the pleasures and profits, and the owners of the land all the burdens and misfortunes and trouble. They have it all on their own side, and none of it on the farmer's side. Let us look out for our own side a little. I am in favor of a closed season of five years, and that no bird shall be killed anywhere in the State of Indiana unless it is a hawk or an English sparrow or some bird of that kind.

A Member: Make it ten years.

Mr. Howland: Yes, or twenty years. I don't want to take any advantage of the law myself. I want it so that even the farmer that owns the land can not kill these birds. I am in favor of more birds and more fruit, and thus the world will be better.

Mr. Kingsbury: I want to say a word or two in support of the proposition made by General Coburn. I am in favor of some stringent penalty for violating the game law and shooting insectivorous birds. I don't know that I would go as far as he does and advocate imprisonment for so small an offense apparently as shooting a bird. That is pretty serious. But if there is anything short of that that would stop the shooting of the insectivorous birds I would be in favor of enforcing it. So far I agree with him, and I agree with regard to making the quail law continuous for five years, with the privilege that if the commissioners find that quails are becoming so abundant that they are a nuisance that they may allow farmers to dispose of them either by shooting them themselves or by allowing hunters to come on the ground. Many farmers would not be willing to have the hunters come on their lands because they would lose not only the quail but sometimes their stock by these trespassers. General Coburn does not desire any appropriation from the Legislature. His idea is merely to give the County Commissioners the privilege if they think

proper to levy a very small tax for the purpose he states—for an experimental garden and a building for the use of the farmers and the institutes and so on in the county seats. The cattle-growing interests, the swine-breeding interests and so on can get recognition from the Legislature. They recognize these interests as interests that bring money into the treasury of the State, but they do not recognize the horticultural business as such. But if it were assisted and developed by the State we know it would become one of the moneyed interests of the State. We know that is so in Michigan and California especially, and in Colorado and other States it is a growing industry which brings much money into those States. Therefore I am in favor of asking the Legislature for this privilege to be given to the County Commissioners to make a small levy for this thing. There are some counties in this State in which the horticultural industry could not succeed by the very nature of things, and there are other counties where if assistance is given it would become a valuable industry. Therefore it is our duty as members of this Society to encourage this industry in this way. We do not ask the State for aid. We do ask it to authorize County Commissioners, when they think it proper, to make a small levy to promote and further this industry.

Mr. Howland: In regard to the appropriation which I spoke of, I referred merely to an appropriation for this Society that it might carry out its experimental orchards. That is what I was driving at at that time, and which I think they ought to do.

Mr. Thomas of Grant County: Last May I was in a county of our State where they were just building a new courthouse. In one corner of the first floor they had a room almost as large as this for the use of farmers. Farmers could go there and spend part of the day whenever they came to town, or they could hold a meeting. With regard to the County Commissioners making appropriations for building a hall, some years ago the Legislature provided that County Commissioners might make a levy to build soldiers' monuments. Afterwards the law was amended so that if it was desired a memorial hall could be built with this money raised in this way. In Wabash County they went to work along that line, and a year ago last November they dedicated a very nice building, a memorial hall, in the city of Wabash. In that building was one room set apart for the farmers of the county of Wabash, and they have it furnished, and they have their tables and keep reading matter there, and farmers coming into town have a perfect right to have access to that room any day during the week. They can come in there and pass an hour or two in reading. Since they built the hall and dedicated it, it has been found inadequate to their wants, and a piece of ground right beside the lot on which the building stands has been bought, and they are going to build an addition to the memorial hall.

Mr. Millhouse: Mr. Howland spoke of the apples of fifty years ago, Fifty years ago we had all the birds the woods would hold pretty nearly. We did not then have hundreds of people coming out in Marion County from Indianapolis every day, Sunday included, seeing how many birds they could kill. There is only one way to protect the birds and that is to send the men that come out to shoot them, especially on Sunday, to the stoneyard or the workhouse. I want a law so that no man shall be allowed to go on the farmer's land and shoot the birds. And that no farmer should be allowed to shoot the birds excepting between the first of January and the first of February, when he has nothing else but English sparrows to shoot.

Mr. Burton: I believe this is a free talk. I have looked upon one thing as being especially the need of the hour, and that is the building up of horticulture in Indiana. That it is on the decline I am sure. I have found that the apple business in this State has almost passed away. In farmers' institutes I have asked how many people had orchards, and sometimes one and sometimes two hands would go up. Something is the matter and this thing needs to be looked after. Undoubtedly Indiana is as capable of growing fine fruit as any place in the world. Indiana sent the finest Winesaps to the Paris Exposition. Three places sent fruit to the Paris Exposition that took premiums. I sent two barrels of fruit myself, one last year and one this year, and each took a premium. I took the premium for the best display of apples against the horticultural societies in all parts of the world. This indicates that Indiana can grow good apples. Indiana does not consume one-fiftieth of the apples she needs. Ninety-nine out of one hundred children of farmers are without apples. The men will buy a nickel's worth of apples in the town and eat them, and the women and children on the farm do without. We used to have apples. As far as spraying is concerned too many farmers began using poor pumps. What we need is to educate the people along this line. Somebody should be sent in the different communities to talk about fruit. I asked Professor Latta, Superintendent of the Farmers' Institutes, why this was not done, and he replied that this was the very thing he wanted to do but could not; that he could only send two speakers to any institute; that if he had a larger amount of money he could send experts to give instruction. We want him to have enough money to send experts to particular localities for that particular purpose. People should not try to grow corn on apple land and raise fifteen or twenty bushels of corn when that particular land devoted to apples and properly cared for would make them rich. If the Legislature would make a sufficient appropriation to farmers' institutes this matter of fruit could be taken up and specialists sent to teach the people.

Mr. Clore: Mr. Burton spoke of people making a mistake in buying sprayers. What sprayers do you use?

Mr. Burton: The Morrill & Morley sprayer.

The President: I think Mr. Burton has struck the keynote to this whole matter. Of course the other subjects brought up are important and should have due consideration. But I think the question as presented by Mr. Burton is the vital question at this time and that is the question of interesting our people in fruit-growing to the extent that they will make a success of it. As he says, we have been failing through these years through neglect. We have not taken up proper lines and followed out the work to success, and hence there have been failures along the line with very few exceptions. Mr. Burton is an exception, and a few others, and the question is, now that the people have become so discouraged and disheartened in the matter of fruit-growing in this State, how shall we again interest them and get them started in the right direction? I have no question at all in my own mind about the fact that we can make it a success if we undertake it properly and proceed on proper lines. They have succeeded in Ohio and in Illinois in the same latitude and in the same soil and under the same conditions, and why not here? A few years ago in western New York they were failing utterly in growing apples, and Professor Bailey and some influential men in the State went to the State Legislature and asked for a large appropriation, and eventually got about \$16,000 for two congressional districts in New York. By the expenditure of this money remarkable results were brought about, and the fruit-growing in western New York has simply been revolutionized and set on its feet through the agency of that appropriation, and many men have gone into the business who have succeeded beyond their expectation. We can bring those results about in this State if we apply the same remedy.

Mr. Henry: Of course I do not know how it is in other parts of the State, but you take it in the northern part of the State and in the north-western part of the State, and I know the farmers and the people in the country generally are very much discouraged. Our farmers have had an entire failure of the wheat crop for the last two years. Prospects now are rather fair, but none the best, and a great many are asking the question, "What shall we do? What shall the farmers do?" They can not raise wheat; they can not raise clover. The clover crop has been a failure, and the question of fruit-growing has been a failure also. That is, it has been a failure in the way it has been conducted. There is not a country district in the State, I do not believe, but what has lost population within the last ten years. You will notice that the country schools are beginning to consolidate, as there are not enough children in the districts to make a school. Why is this? It is simply because the young, and thrifty rising generation are going at something else. They are leaving the country districts and the old farmers lack interest in fruit-growing or in farming generally, and something, I think, ought to be done to arouse an interest in the State of Indiana in agricultural and horticultural pursuits. Teach

the people what to do and how to do it. There is no question but our section is one of the very best apple-growing and pear-growing sections there is. I believe the United States Government at one time made a report that our section of the country was the best pear country in the Central West, and yet there is not a pear orchard in northern Indiana that amounts to very much, and I think a large appropriation for the purposes of educating the people along this line would be well. There should be a law requiring these old orchards to be cut down and done away with, and then teach the people to begin anew and teach them how to raise their trees correctly and how to spray them. About two years ago a man came along my place and said, "I am spraying fruit trees at ten cents apiece." I said, "Are you getting much to do?" "O, yes, some." He had a tin sprayer which could be bought out of a store for a dollar and a quarter. The next year I talked to several farmers about spraying, and they would say to me, "You needn't talk to me about spraying. There was a man around here last year who sprayed my trees, and they are just as bad as ever." That is about all the knowledge they have about spraying. There seems to be a lack of knowledge on the subject of spraying and on general principles of fruit-growing.

PLACE OF THE APPLE ORCHARD IN THE ECONOMY OF THE FARM.

H. H. SWAIM, SOUTH BEND.

From the earliest settlement of this country the apple has been recognized as an important factor upon the farm. Not alone for its commercial value, for those consumed upon the farm have a value which can scarcely be computed in dollars and cents.

The pioneers recognized the necessity of fruit to balance their rations of hog and corn and planted a few apple trees almost as soon as the land was cleared. Planted as they were in the virgin soil, protected by the surrounding forests, they produced bountiful crops of fruit with but little further attention; this success induced the settlers to continue planting until finally most farms had a flourishing apple orchard, furnishing a bountiful supply of health-giving fruit for the family, and in many cases adding a source of revenue to the farm.

Conditions have changed so that it requires more care and skill for us to grow apples than it did in this early day. We have not the virgin soil in which to plant our trees, the forest protection has been removed, and we have many more insect pests and diseases to contend with, but the value of the apple as a farm product remains unchanged, and the

greater difficulty we have in producing them should only make us prize them more highly.

The farmer of to-day has a much greater variety and better prepared food than had the pioneers, but we have not enough that we can spare the fruit which we now have in such perfection and plenty. There has been much improvement in the variety and quality of our fruits in recent years; while the apple may not have kept pace with some other fruits in this improvement of varieties, it still holds its place at the head of the list of fruits and stands pre-eminently the fruit for the farmer. It is easily grown. Any farmer who has enterprise enough to raise blackberries along the fence rows can grow apples to some degree of perfection. The season during which they can be had in their natural state is longer, and the variety of ways in which they are used is greater than any other fruit.

With ordinary care in the selection of varieties, handling and storage, a farmer can have a bountiful supply of this delicious fruit from July to April, and if he is fortunate enough to be in reach of cold storage facilities, their season need never end.

There is usually a surplus of summer and fall apples which far too often are allowed to go to waste; probably the most satisfactory way to care for these is by drying, thus converting them into a remarkable product if not needed for home use.

We all remember how this was done in our boyhood days. How vivid the memory of the apple-paring bees, when the young folks gathered evenings in the old farmhouse, peeled and quartered apples and strung them on strings, to be hung next day in festoons about the kitchen stove to dry, and incidentally serve as a fly roost. This was not all that was done at these paring bees, but I need not digress to give the full program, for I doubt not I have already stirred to life tender memories in the hearts of many of you. The drying was sometimes accomplished by spreading upon racks and placing in the sun, but this was not always satisfactory, for farming was not all sunshine then any more than now. There are now a number of different makes of evaporators on the market in sizes to suit the needs of all; while they take away much of the romance connected with the old style dried apples, they make a much cleaner looking product.

The most careful grower can not have all his fruit perfect, and when we come to care for the winter apples we find more or less windfalls and culls, which must be used at once to avoid waste. The evaporator is here again brought into use, but the bulk of these are made into cider—the beverage of the farm. This has a market value far below hand-picked winter apples, but it is a means of saving that which would otherwise be a total loss. That which is not sold or consumed as cider can be converted into vinegar. While this has to compete in the market with city-made vinegar, it always finds a ready sale. Another common way of

using cider is the making of apple butter. This adds very materially to the food supply for the farmer's table and is another product of the apple which finds a ready market. These are usually considered small matters by the average farmer, but in the aggregate they add very materially to the income of the farm. Considered from a financial standpoint no farmer can afford to be without a healthy, well-cared-for orchard. There are other values but little less important. Chief among these are their health-giving qualities: What we will call the social side of the apple is also worth mention. I have already referred to the social gatherings of the neighborhood boys and girls for the purpose of paring apples to dry, etc. Not less vivid is the memory of the homes of our childhood. The long winter evenings with father and mother, brothers and sisters, gathered about the roaring fire in an open fireplace, a picture that would never be complete without a pan of rosy-cheeked apples and the pitcher of cider.

These memories never fail to arouse tender feelings in our breasts which make us better men and women.

DISCUSSION.

Mr. Burton: That reference to drying apples brings to my mind the fact that I used to string apples, and when they were dry there would be a hard place where the string went through.

Mr. Swalm: That was because you did not take the core out.

Mr. Burton: A dried apple is not like one which we term evaporated. If you string your apples on a wire and don't let them touch, there are no hard places in them.

Mr. Swalm: I would like to ask Mr. Burton how he would keep the apples apart.

Mr. Burton: I would stretch the wire horizontally. I want to speak about the Kentucky red cider crab, which is rarely grown except in southern Indiana and Kentucky. It is largely grown in Kentucky to make cider. It makes rich crab cider; these apples when stewed are as rich as apple butter, and when they are sweetened with a proper amount of sugar they make one of the most delicious messes of apples that could be prepared. Those apples will keep until the middle of next summer. You could not eat one of those apples in the raw state. It is not only sour, but it is bitter and puckery, but after the cider leaves the apple, and when it is cooked, that isn't there. They are a little more subject to scab than most of our apples. That is the only weak point about them.

Mrs. Stevens: I do not think the Society ought to go on record as allowing Mr. Burton to say that they drink cider in Kentucky. I live too close to the line for that.

The President announced the following committees:

Committee on Finance—G. P. Campbell, Snead Thomas and Amos Garretson.

Committee on Exhibits—L. B. Custer, W. C. Reed and Sylvester Johnson.

Committee on Resolutions—Mrs. W. W. Stevens, H. D. Simpson and J. C. Grossman.

Thereupon the Society adjourned at 5 o'clock, until 7:30 o'clock p. m., at which time the Society reconvened, and first listened to an address by President W. E. Stone, President of Purdue University:

EDUCATION FOR THE HORTICULTURIST.

W. E. STONE, PRESIDENT PURDUE UNIVERSITY.

I will say in the beginning that the invitation to speak before your Society was accepted with considerable reluctance. It seemed to me presumptuous to take up your valuable time with anything which I might have to offer, for I regard you as experts in a field in which I have no expert knowledge. I stand here, therefore, by your indulgence, acknowledging on my part a pronounced taste for the fruits of your efforts, although I am unable to contribute to your practical knowledge.

I suppose there is no kind of industry or profession at the present day, certainly none which plays any considerable part in the affairs of men, of which it can not be said, that its methods have in recent years undergone great changes. The condition is that which we refer to when using the phrase "a business has been revolutionized." I think I do not err in saying that this general statement applies with great force to the art of horticulture. Let us look for a moment at some of the progressive changes which have affected your business during the present generation. The wonderful development of facilities for transportation has extended your market and at the same time increased the number of your competitors. It has also contributed toward familiarizing your customers with all of the varieties of fruits and vegetables, and aided them in cultivating a more discriminating taste. The same conditions facilitate exhibitions and conventions, sharpening the wits and assisting in the exchange of new ideas. There has sprung up a new literature of horticulture. Books on horticulture exist of very early date, but their character is

different from the books and journals of to-day. Formerly they were discursive and descriptive; now they are practical, scientific and business-like. Again, what activity in originating and propagating new varieties. Many of these may prove worthless, but, until this fact is ascertained, no one can afford to ignore them. Even the methods of planting, cultivating and harvesting of many kinds of fruits and vegetables have been greatly modified. The construction of greenhouses has been radically improved and the use of these structures extended to cover almost all forms of small fruits and vegetables for which there exists an unseasonable demand. The methods and management of orchards and gardens have become intensive, concentrated, and at the same time have developed into affairs of large magnitude. One hears now of the drainage and fertilization of the soil. Artificial and animal manures intrude themselves upon the gardener's attention. Insect pests and various diseases of plants, formerly unheard of, spring up, and in due season we are told how to destroy or combat them by our learned friends of the experiment stations. These experiment stations command intelligent attention to their publications and scientific researches. And so I might go on at great length if it were necessary to show that the successful horticulturist of to-day is expected to know a great many more things than his predecessors of a generation since, and must be able to cope with conditions quite different. Now, if we analyze the situation, we find that these changes represent in every case the application of scientific principles to business. Your business, like any other, is advancing because it is being conducted more and more on a scientific basis. You say that competition is closer. No; men who have the best scientific equipment can do things and are doing things which can not be done by those who lack it. The successful horticulturists are those who are utilizing to the greatest extent the scientific progress of the generation. They may not know it under that name; they may repudiate any interest or sympathy with science, but the fact remains they are making good use of what science has done for their business.

Every one knows that to successfully engage in any enterprise these days, one must have the best equipment possible. It is not generally recognized, particularly in the various agricultural occupations, how important a part of this equipment is scientific training, but it does not require any abstruse reasoning to come to the conclusion that in a business based upon, and constantly developing upon scientific lines, a knowledge of the science involved is highly important. Some of the industries are already keenly alert to this situation and welcome to their ranks those who have pursued a careful course of scientific training therefor. On the other hand it is also true that many who rate as successful men place little value on technical or scientific training for practical affairs. Such men are usually those who have risen by their own efforts, in other words, self-made men. They, with commendable pride in their own suc-

cess, are disposed to expect similar achievements from others. To such I would say, first, that no one looking forward to a life career can afford to neglect or omit any step of preparation which can contribute to his prospective success. If he has good natural wit, so much the more reason why he should supplement it by training and education. If he has no more than ordinary intelligence or shrewdness, he certainly should not neglect the assistance of special training. Again, the day of the self-made man is passing. In the early stages of every industry or profession, before its principles have been crystallized or before large funds of knowledge have accumulated, it is possible, and usually necessary, for those who would master it to do so by their own efforts, accumulating by unaided study and experience a masterful knowledge of the industry. But just in proportion as the industry advances this process becomes more and more difficult and unprofitable. The old apprenticeship system, while it has many good features and was at one time adapted to the conditions, is now an anachronism. No one who hopes to master any profession, or trade, or business, or industry, expects these days to do so by his own efforts. Special schools, technical or professional in character, have sprung up in connection with the modern scientific development of business, whose function it is to impart to young men and women the fundamental principles of their industry in a much briefer time and with much greater efficiency than they could hope to do for themselves. As well might the Indiana fruit-grower attempt to market his strawberries in Chicago with a hand-cart in competition with his neighbor who calls into service an express train, as for a young man to hope to prepare for a career in the coming generation by self-effort, instead of utilizing the latest and best opportunities for training.

Of course, no one expects that technical training alone will fit a man for business, or that it can be a substitute for common sense, or experience. A man must have all of these. Teaching a child to count will not make of him a business man, but nevertheless you will not omit to teach your boys and girls to count, because you know it will be a valuable adjunct to their other mental qualities, and so you would not knowingly deprive your children of any kind of education or training which was likely to apply to their future career. You see I am making a plea for technical education. By technical education I mean a knowledge of the natural sciences and their application to any industry or profession. Agricultural education is technical education of the most pronounced kind. Because agriculture in its various forms, one of which is horticulture, is so wholly and completely the utilization of natural forces, it is the industry above all others in which some knowledge of these forces is essential to success. Heretofore, farmers, horticulturists, etc., have been self-made men, partly because there have not been opportunities for training and partly because the state of the art has made it possible. But let me remind you that agriculture is beginning to be as progressive

as any of the other industries. The applications of science are beginning to tell, and the day is at hand when in this neglected field technical training and proficiency are to be quite as essential as in any other.

I do not think this is recognized so generally as it should be. Some men foresaw this a generation ago. The United States government foresaw it and established the magnificent agricultural colleges that are such a credit to our country's educational forces. But the members of the industry have been slow to appreciate or utilize the opportunities thus offered. Just now there seems to be a general awakening, and our neighboring States are patronizing and sustaining their agricultural schools with generosity. I fear lest Indiana may fall behind in this movement. The facts show that your agricultural college, with somewhat meagre equipment, has been producing good results and has been well attended as compared with other States. It needs and must have a better equipment for its work, and I say frankly, it must take that equipment and do better work, and the farmers, the stock growers, the dairymen, the horticulturists of the State must give it better support and send more of their sons and daughters to it. We must all do more and better if we are to live up to the demands and magnitude of the industry which your Society represents.

I wish to appeal to you to cultivate a better knowledge of the institution which has been established in Indiana for your benefit, and as you know it better and better, I hope you will make greater use of its facilities and contribute of your influence to secure for it the co-operation and aid of all who are interested in the progress of agriculture.

President Hobbs: We are fortunate to-night to have with us Professor Burrill of Illinois. He discovered some years ago what the apple blight was, or what was the cause of it. Now if he can tell us to-night or sometime in the near future what the remedy is, we will see that his name is written high in the new hall of fame we are going to have shortly.

THE BOTANY OF THE APPLE.

PROF. T. J. BURRILL, UNIVERSITY OF ILLINOIS.

What is an apple? If there is one thing upon which there is no disputing concerning taste, it is that an apple is a good thing to eat, a very excellent thing to eat. This is definition enough for some people, and in certain moods and fancies of us all, it is altogether sufficient. But trying again, the reply may be, an apple is a spheroidal, fleshy fruit, covered with a thin skin and containing a five-divided core with thin but hardened

walls, within which several seeds are produced. This is quite an answer, different from the first and better or worse according to the standpoint taken. Again, an apple is a pome, and a pome is a fleshy, indehiscent epigenous pericarp, containing several cartilaginous loculi. What an advance! Here we have things, if not done up in a nutshell, at least enclosed within an impenetrable coat of mail. What a marvelous thing an apple is, if it can be so described! Is there anything more to be added? Have we fully answered our question? By searching, possibly something further can be found. Now a few learned as well as honest people read into the history of a world-important transaction, that an apple was the tempting morsel through which paradise was lost, and as a perpetual reminder of our forefather's transgression each of us of the sterner sex carry in our throats to this day the inherited swelling called pomum Adami! An apple, therefore, is a significant thing, as well as a something good to eat, or about which to conjure with words. Alas! that higher criticism should destroy William Tell and his wonderful archery, and that ruthless text-readers should deprive the first gardeners of this best of all fruits of the earth.

But there are methods of dealing with a text besides asking a direct question and replying by a closely formulated answer, otherwise it is feared many sermons would be shorter even than modern pew-holders demand. My subject is the Botany of the Apple, and botany is text enough presumably for any such occasion, though limited as in the present instance to one species of the vegetable kingdom.

If we ask again, "What is an apple?" the reply may be made, that it is either the swollen end of a branch, or it is a joined and thickened cluster of leaves. This, however, in either alternative, may not be very evident, and so at least permits explanations, and this again seems to be the opportunity we have been seeking. Let us see.

One hundred and fifty years ago the immortal Linnaeus, the father of botany, penned the first line in existing literature bearing upon our subject. He was not the first to conceive the idea which his words expressed, and he was apparently very cautious in his statements. Here they are written when it was considered that nothing but the Latin tongue was good enough for scientific statements. "*Principium florum et foriorum idem est.*" This being translated is: The origin of the flower and of the leaves is the same. And again: "*Periantheum sit exconnatis foliorum rudimentis,*" or the perianth (calyx and corolla) may be from the rudiments of united leaves. The use of *sit* instead of *est*, in this latter sentence, shows his state of mind. The calyx and corolla of the flower may be, not are, rudiments of leaves. It was a moot proposition, but it is thus shown that the question was then in debate. Forty years later, in 1790, the illustrious Goethe published a work which has since been much cited, under the title, "*Versuch die metamorphose der pflanzen zu erklären*"—an attempt to explain the transformations of plants. In this

work Goethe used is instead of may be, and advocated the proposition that the parts of the flower are transformed leaves. There were others before him who as boldly asserted the same thing, but the prominence of the great German scholar and author in other matters gave his writing wider reading and more respectful consideration. Still, owing to the apathetic or prejudiced spirit of the age, even Goethe's work was considered a piece of fanciful and fruitless speculation, rather than the presentation of a fecund truth, through which the eyes of the blind might be opened to the beauties of scientific revelations and to their untold importance in practical life. It must be confessed, however, that Goethe mixed with his science many products of his sportive imagination having no support through evidence. This was the habit of the age. There was then little real science, little appreciation of that inductive logic the following of which has since so transformed the modern world in all departments of life and of thought. But gradually in the early part of the new century, that now waning to its close, the methods of modern science were more closely followed and permanent steps in the marvelous progress, which distinctively characterizes and crowns our era, were soon made. When De Candolle of Geneva published in 1820 the second edition of his *Theory of Botany* (*Theorie Elementaire de Botanique*), apparently without knowledge of Goethe's work, he discussed the homologies of the parts of plants, basing his ideas solely upon observed facts. And when in 1827 he wrote his *Organographic Vegetale*, he was positive in the conclusion that flowering plants are composed of only three elementary or basic organs, viz., root, stem, and leaf, and that from these are formed all other constituents of vegetable structures, including the parts of flowers and the make-up of fruits. In this at length the philosophic botanist was supported by the entire body of his contemporary scientists. It took half a century from Goethe to establish a doctrine, the facts of which now seem plain and easy of demonstration by anyone, and to which more than another half century has practically given universal acceptance on the part of all those most competent to speak upon the subject. It can not be said that root, stem, and leaf are any more entitled to rank as the primary or fundamental organs of plants in any other sense than that most other structures are directly or indirectly modifications of them, but in this sense they must be so regarded. No matter how much they may be disguised in other structures, we may wisely anticipate finding the marks of one or more of these organs in all vegetable growths.

To illustrate: A simple case is that which we call a strawberry. We all know the wild plants sometimes called barren strawberries (*potentilla*). These have much resemblance to the plants which bear the crimson, pulpy fruit. Indeed botanists can hardly separate them, or at least some of them, generically from the true strawberries. They differ in that there is no fleshy body on which the numerous so-called seeds are borne. The latter, however, are present and are borne, as in most plants, on the

terminal end of the stem, called a receptacle. In these "barren strawberries" this last named organ is clearly the end of the stem itself, scarcely modified except in the use to which it is put. But by a little further observation we can be just as confidently assured that the somewhat swollen and meaty part of some wild strawberries is the same in origin as the dry receptacle of the other plant. Then it is only a matter of further swelling and perhaps of increased meatiness until we have the most luscious of these ambrosial productions. The tasteless, unattractive, small tip of the stem has become the meaty-melting-mouthful of perfumed sweetness and sourness which we call the strawberry, but which in its highest, most aristocratic development bears the indubitable marks of its low origin.

As a different, but still simple case, the tuber, which we call a potato, is a modified branch. Potatoes are commonly classed among root crops, but the tubers are the swollen terminal ends of modified branches of the stem. The so-called eyes are clusters of buds, structures not usually produced on roots. These special branches have formed the habit of turning down instead of up, as do most stem-branches, and of remaining buried in the soil. The white slender part of the branch whose swollen end is the tuber is easily distinguished from the real roots of the plant. In the case of the peanut similar branches, growing first above ground and bearing a flower, subsequently turn down and penetrate the earth. In both the departure from normal forms can be so easily traced back to the latter that we will not further describe the process. A common potato is merely an enlarged and richly stored portion of a true stem, a peanut is a bean produced in a pod.

Now let us see what a pod is. In some cases this is very readily made out. We feel sure at once it is not a transformed root, and it looks more like a modified leaf than a part of a stem. Taking this hint it requires no great acuteness of insight to discover that the pod of a garden pea is a folded leaf, or rather it is a structure which originally was a leaf and which still bears marks of that origin. The line along which the peas are borne marks the joined edges of the leaf, while that along the opposite side is the midnerve. In some instances a reversion takes place when the structure is more leaf than pod, showing very clearly the nature of the latter. If now we examine the ripened structures in the center of a flower of the common peony we shall find a cluster of from two to six smaller pods each shaped something like that of the pea. They stand on the end of the stem with their inner edges meeting in a line of the axis of the latter, and their outer edges in radiant lines from the center. On opening these little pods we find vertical rows of seeds along the inner or central face of each of them. Here again the seed-bearing lines mark the joined edges of a folded leaf modified into a pod. We could easily represent the fruit cluster of the peony by similarly arranging so many pea pods in a cluster.

It would seem, perhaps, a long distance from an arranged group of pea pods to an orange, but a little comparison may serve to make the structural differences appear less pronounced. Cut the orange transversely through the middle and note the radiating lines reaching from the center to the thick rind. Note that the seeds are found only next the central column. Peel the fruit and carefully separate the pulp into the divisible parts. What have we here in each one of these sections, if not a representative of the pod as produced by the pea or the peony? It is no stretch of the imagination when we conclude that an orange is a cluster of leaf-formed parts with the walls in contact thin, but still separable, and with the outer walls thickened into the peeling or rind of the fruit. Each part or modified pod instead of being hollow is filled with the juicy pulp. There is no room for doubt, however, that an orange is a cluster of some eight to ten, several-seeded, pulp-filled pods, and the entire fruit is a cluster of modified leaves set apart for special service.

We are now perhaps ready by so guarded an approach to ask again, "What is an apple?" The peony fruit cluster is a good type for the apple core. In this there are five pods with seeds attached to the inner angles. Here then are five specialized leaves each infolded and seed-bearing along the meeting margins at the center of the fruit. By looking closely at the cross section of an apple we are able to find at the outer angle of each pod a rather obscure green dot representing the midvein of the constructive leaf. But there are other and plainer green dots and a fleshy mass of tissue which calls for further attention. All botanists agree in what has been said so far, concerning the structure of an apple; but difference of opinion are expressed as to the make-up of the part external to the core. The circlet of five green parts, constituting the eye of the apple, is the persistent calyx of the flower. In this, too, all are agreed. Each point is a sepal and each sepal is a modified leaf. Does this rudiment of a leaf stand upon a thickened stem hollowed out and enclosing in its cavity the circle of core-leaves, or are the sepals themselves joined together except at the tips and thickened to form the rich pulp? In other words, is the mass of the apple a consolidated bunch of leaves like the orange, or is it a thickened, urn-shaped end of the stem on which the floral organs are borne?

In this there is much difference of opinion, tending in later years to the latter assumption. It is well known that the bundles of fibers forming the midvein and stalk of a leaf run down in the tissues of the stem for some distance below the point of leaf attachment, as a distinct strand. By making longitudinal sections of an apple it is easy to find green lines running from blossom to stem with a wide curve around the core. By a little inspection it may be determined that these lines correspond to the green dots seen in cross-section of the fruit, and by further examination it is found that the line corresponding to the more conspicuous dot, placed directly outside of each core-cavity, runs into a sepal at the eye. The five

dots then immediately exterior to the five folded core-leaves are transverse sections of the midveins of the five sepals or component parts of the consolidated calyx, or they are traces in the thickened stem of the fibrous bundles descending from these midveins. In any case these lines and dots, according to the direction of the plane of section through the fruit, preserve to us remarkable suggestions concerning the life-history of the apple. These rudiments seem to persist solely for this purpose. They are retained out of respect to their ancestors. In the Siberian crabs the green tips of the eye are deciduous; the ancestral respect is less deeply ingrained in the modern progeny, though the dots and lines continually recount the story from generation to generation. Turning again to the cross-section of the fruit, we find five other dots alternating with those already described. These each stand in a radiant line midway between the exterior points of the core. In the longitudinal section the corresponding lines are not so well marked as are those running into the sepal tips, but are still easily followed and clearly emerge in the angle between the green leaflets of the eye. Upon an examination of the flower, this is found to be the position of a petal. The latter has departed this life, but has left behind the evidence and story of its being. As there are ten parts in the perianth or leafy composition of an apple blossom, so there are ten dots in the cross section of an apple, and the two sets of facts are correlated together in the phenomenal life-history of the fruit.

But in this cross-section there is a wavy line clearly enough seen encircling the core. In our orchard apples this line is usually faint, a mere trace, and it often weaves inward and outward like the folds of artistic drapery. A little study soon shows that the curves are not irregular, that they dip inward to approach the outer angles of the core, and swell in graceful stretches between these points, differing in their course in different varieties of apples, and in some essentially circular. In some cases, in very ripe fruit, a separation of the tissues along this line is observed, and in our common wild crab-apples this is a usual characteristic. At least after freezing, the very hard spheroidal core of the latter fruits fits like a bone in its socket, from which it can be removed so as to leave a smooth surfaced cup, the walls of which are also bony in hardness.

By beginning at the blossom end of an apple and making thin slices by horizontal cuts, the meaning of the circular or wavy line in question can be made out. The first slices below the base of the eye have each a circular hole in the center through which pass the dried remains of the upper parts of the pistils (styles). The pistils below merge into the parts of the core (ovary), while the tissues forming the lining of the central cavity (holes in our sections) grade unmistakably into those of the ring which engages our attention. All of the structure inside of the ring belongs to the core and has been derived from the five pistils of the flower; all outside of the inner cells constituting this ring belongs to the

wall of the urn-shaped receptacle or consolidated sepals, whichever, in fact, this exterior and larger mass of the apple proves to be. Studies of cross-sections of very young apples show this boundary line to be at that stage a circular one; the various folds or curves seen in a matured apple are due to the development of the fruit and to its swelling through the process of growth. However irregular the line may be, it is to be noticed that it always runs inside of the ten green dots before mentioned. This must be the case if the line represents the boundary between the ovaries, the true fruit, and the surrounding mass, for the petals and sepals are always outside, in the flower, of the pistil or pistils. The greater swelling of the pulp between the radial parts of the core, usually pushes the five corresponding dots further from the center of the fruit than are the alternating five standing radiately out from the core-cavities, but the latter may be seen to be structurally farthest out because they are at a greater distance from the core-boundary line, and they are always found the outermost ones in sections of very young fruit, just as we should expect from the fact that the sepals are exterior to the petals.

A fruit has been defined as the matured ovary and its contents. If we adopt this definition in its literal signification, we have both more and less fruit than is commonly supposed in an apple. Each segment of the core with the contained seeds and adherent pulp to the above described line, is a fruit; but the exterior pulp is no part of the tree fruit. Still we shall do well to make no such distinction when we buy the "fruit" of the apple tree, or when, with or without temptation, we proceed to enjoy the rich stores of the fragrant pulp.

As has been said, botanists disagree as to the nature of the exterior portion of the apple, with perhaps a growing tendency to decide that it is the excavated stem or receptacle and that all that remains of the calyx is the five free appendages constituting the "eye." Possibly the fleshy mass is a combination of stem and modified leaves, but there are certainly some reasons for the belief that the latter have left traces of themselves besides the fibrous tissues in the lines heretofore considered. There are in the pulpy substance numerous fine, branching lines strongly suggestive of the venation of the leaf, best seen in most cases after the cut fruit has been allowed to shrivel somewhat in drying. Some of these cut transversely show dots similar to, though smaller than, the ten regularly placed ones. They are certainly composed of cells like those making up the veins of the leaves and give good reasons for the supposition that the lines are indeed leaf-veins. Then in some apples, for instance, Talman Sweet, and Snow, or Fameuse, there are distinct lines seen on the exterior of the fruit, running from stem to blossom. These are commonly green on what are called self-colored apples, viz., those which have not fed coloring in the skin; but are otherwise marked on red surfaces. Often there is only one such a line; not more than five have ever been noted by myself nor by others so far as known to me. Whatever the number,

they run into the middle of the sepals at the eye. They are, therefore, by position midveins or leaf-stalks of the latter. It is true we have found the fibrous tissue of these structures deeply imbedded in the flesh of the apple, but there is nothing to prevent the supposition that the wide separation has come from the enormous development of this fleshy mass. The inside line of fibers and the outside line in the skin may well enough have been parts of the same structure.

Occasionally we find an apple that is apparently made up of two distinct sorts with each kind keeping well its own characteristics. Sometimes a well marked part of such fruits is quite green, while the rest of the apple is yellow; less frequently one section is lightly touched with red while the other parts are deeply colored, or one part is russeted while the other is smooth. These differences may be more than skin deep; it has been asserted that a combination of part sweet and part sour substance has thus been known in the same fruit, but caution is necessary in the acceptance of such statements. Now these curiously marked areas are always in longitudinal sections, and they are sections of one or more tenths, or more commonly one or more fifths, of the entire apple. If we look closely we shall find that the dividing line between the different sections correspond usually to the point of a sepal, that is to the midvein of a sepal, as before explained. When the surface of two or three-fifths of an apple is thus curiously marked, it is found that the boundaries are all determined by the position of the center of the calyx lobes, not as would seem to be most natural by that of the line of union of adjacent leaves. All of one such leaf and the next halves of the two neighbors make two-fifths of the whole, and this division has been observed. What makes this curious structure, or difference in structure, is not known, but there is some connection with the calyx lobes. The positions of the dividing lines show that it is not a phenomenon correlated with the parts of the core, as some have thoughtlessly imagined; if upon other grounds such relation could be assumed. A cherry or peach flower is essentially similar to that of the apple, save that the ovary stands free in the central cavity with its walls altogether separated from that of the surrounding parts. As the flower fades this surrounding wall is cut off at a circular line around the base of the ovary just as leaves are cut off at maturity at the point of juncture with the stem. This indicates that the wall of the cavity is the calyx tube and would settle the controversy were it not a fact that parts of the stem are sometimes cut off in the same way.

Upon the whole the evidence presented and other known facts weigh rather heavily upon the side of the leaf-origin of the exterior portion of the apple and join it in this respect with that of the interior or central mass, and furnish the basis of the statement that when we eat an apple we are in fact enjoying a feast upon a consolidated cluster of ten or fifteen leaves, ten rather than fifteen, because little addition probably comes from the contributions of the petals.

We may now rightfully ask for the purpose of such radical departure from the normal structure, supposing that sometime in the past the change has really taken place. We must seek such purpose in the interest of the plant, not try to make our own desires or necessities the basis of reasoning. We know that plants produce many more seeds than can ever actually develop into structures like the parents; that some distribution of the seeds produced is a prime necessity in order that even a small fraction of them may grow into adult plants. There is abundant material for a lecture or a book. We can only say now that the devices by which seeds are scattered are wonderful in variety and often very curiously contrived. That they are effective is abundantly shown in the results. For example, a piece of land, originally prairie, had been cultivated for thirty years by a thrifty farmer; then was planted (some fifteen acres) with forest tree seedlings which had been grown in nurseries well away from native timber. It may be assumed that there were no seeds or seedlings present of any woody growth except such as were transferred from the nurseries and set in the rows of the new plantation. The nearest woods were miles away, yet after twenty years there were found in this artificial forest-tree plantation over thirty kinds of trees, shrubs, and woody climbers other than those planted by man. Upon investigation it was determined that every one of those introduced plants bore edible fruits, such as are consumed by birds. Why is it that a cherry when ripe has a conspicuous color, a luscious pulp, a hard stone? Why is it that seeds of the wild crab-apple or thorn-apple are incased in a hard core which is embedded in edible and toothsome flesh? Why is it that apple seeds are wedge-pointed and are slippery when wet? The answers are plain to us all. These fruits are made to be eaten. They are conspicuous in coloring that they may be seen, are pleasing to the taste that they may be eaten, and the seeds are adapted to pass unharmed the ordeals of the digestive process of animals, thus to find chance away from the parent plant for possible growth and development. Man takes advantage of the plastic nature of species and by the arts of the husbandman and the gardener molds their products to suit his own fancy or needs. The wild crab has become in nature's own ways wonderfully adapted, through remarkable changes of form and of character, to its needs, and man has made by imitative processes the orchard fruit from the crab-apple. There is a long botanical story here that can not now be told, though it is one that horticulturists ought not to grow weary in following. There is in it the encouraging prophecy of better things to come, of improvements of which we see only the beginning, of richness and abundance in the returns from the orchards of which we can now only dream.

But there is another botanical matter that may not be passed in this account of the apple, for it touches closely practical interests now much discussed. It is well understood that the action of pollen is essential to the formation of the apple; no fruit is started, after its first stage of ex-

istence, on its way toward development, without the stimulus of fertilization. Seedless fruit of other kinds are more common; but these, too, such as bananas and navel oranges, spring from flowers whose pistils are fecundated by pollen tubes. This latter process is primarily for the production of seed, but secondarily for the development of the attractive substances by means of which the seeds are helped to dissemination. Now the operations of the wonder-working principle of heredity is susceptible of cautious freaks. Here is one: By means mostly unknown to us, the secondary stimulus of the pollen may in particular instances be operative without the first, and this peculiarity, this *lusus naturae*, is perpetuated by heredity. It is indeed thinkable that when once so started the acquired propensity to produce fruit substance without seeds could continue without further aid of pollen, but no example has been observed. When an apple is discovered originating in sexless flowers and developing just as does a potato tuber, we shall have found something thoroughly new in the horticultural world.

Now let us turn to the kinds of action of the pollen upon the embryo itself and upon the accompanying or surrounding tissues of the pistillate plant, the primary and secondary stimulus spoken of above. It is matter of common knowledge that the embryo partakes of the nature of both parents, that pollen from a characteristic source impresses itself and its peculiarities upon the progeny. But the embryo in an apple is wrapped up in a fertilized seed. Are these pollen characteristics also impressed upon the parts we commonly call the fruit? Are either the papery parts of the core or any portion of the exterior pulp modified by the pollen in such manner as to partake of its quality? All biological science answers, No. Yet we have seen that the exterior substance, as in the case of a navel orange, may develop without the accompanying production of an embryo or the formation of a seed. Recently, too, it has been clearly shown that certain fruits, including some apples, which do commonly produce seed, through the influence of their own pollen, become noticeably larger and sometimes different in shape when fertilized by foreign pollen. Where, then, is our biological science and its universal negation?

The puzzle is not so hard as it seems to be, but the evidently correct solution has had little exposition. Let us see if it can now be stated.

When the pollen tube grows down through the tissues of the pistil it carries with it a cell-nucleus which has come to be known as a very definite and easily recognized structure, through the methods of the modern botanical laboratory. This particular, well-known, individualized bit of protoplasm actually coalesces or blends with another individualized and equally well-known and separated bit of protoplasm in a particular cell formed in the tissue of the ovary during the development of the flower. These two minute but readily studied structures form one compounded body from which, by regular and also well-understood processes of vegetative growth, the young embryo is solely derived. This embryo

is in very fact and substance part and parcel of the two generative nuclei, and it includes them entirely; there is nothing left of them to unite with anything else. There is to be sure a second, something similar and also well-known nucleus sent down by the pollen tube, and this, as has been recently found, has another office in forming the nutritive tissue immediately surrounding the embryo, and rationally explains the effect of the pollen the first year, for instance in a grain of corn. But this action is definitely known to extend no further than the embryonic structures. The outer layers of the corn grain are transparent and may permit a changed color within to show through; but these outer layers, the hull or bran, of the grain are in no sense modified. This outer portion of the corn corresponds in part to the shell of the apple seed, which is certainly beyond the influence of the pollen in any way analogous to that upon the embryo within, as are all structures exterior to it. It is not saying too much when it is asserted, and with the utmost conviction of truthfulness, that no apple ever showed, in any part or over the whole surface, inside or outside, any indications as of color, russeted skin, shape, flavor, etc., as an inheritance from a pollen-producing variety, many loose assertions to the contrary notwithstanding. This is strong language, but it is all meant. The matter is one upon which a botanist may confidently make strong expressions and composedly rely upon the ultimate issue of a controversy.

Still, foreign pollen does make in some cases, as has been said, a difference in fruits externally considered, a difference plainly recognizable as different from the typical production of self-pollinated flowers. So, too, simply cutting of a twig from an old, slow-growing geranium, and starting this cutting by florists' methods, makes a young plant, a rejuvenated plant, with the characteristics of a young, rejuvenated plant. The leaves are larger, the growth is more rapid, the stem more succulent, the flowering propensity less pronounced. But otherwise the peculiar, innate characteristics of the old plant are all represented in the new one. It has no new elements of form, or color, or fragrance, or habit; it is simply young. Now the differences noted as due to foreign pollen on fruit are all such as are connected with stimulated growth, a pure and otherwise unmodified acceleration of development. This is the sole effect of pollen of any kind, from any source, on the structures exterior to the embryo and to the so-called endosperm of the seed. It is a secondary stimulus and a consequent activity of growth, whose peculiarities are inherited like other specific characteristics of an organism. If this is the role generally of fertilization upon the exterior fruit structures, we should be well prepared for a difference in the amount of the stimulus and of consequent growth due to different kind of pollen. Read Waite's and Fletcher's bulletins, from the presses of the Department of Agriculture at Washington and of Cornell University in this light, and see how rationally comes not only the evidence of modification but the satisfying explanation thereof. The whole subject is one to be commended to the fullest and most careful

consideration of the practical fruit-growers, as well as to the botanical investigator and theorizer.

Here we pause. What is an apple? Something good to eat; something inviting, satisfying, health-giving—but more. It appeals as strongly to man's mental and moral natures. There is in its make-up something inviting, satisfying, health-giving to the mental appetite and intellectual digestion; it bears lines and marks engraved more durably than by chisel upon granite from the everlasting hills, by the Supreme Author of all being, and made intelligible and inspiring to all who rationally and reverently read.

[Note.—The lecture was illustrated by enlarged drawings upon charts and frequent reference was made to these illustrations in explanation of the text. The reader will do well to cut apples in halves both crosswise and lengthwise and to study these in connection with the statements made by the author. Compare also other fruits mentioned.—Secretary.]

DISCUSSION.

Mr. Tilson: I think this is one of the most remarkable essays I ever heard, because I couldn't understand any of it. He says the apple is nothing more than a leaf, and describes the apple and the leaf as one and the same. But the apple may be sweet and the leaves never sweet. All leaves taste alike.

Professor Burrill: I have sometimes gnawed a cornstalk and have found it to be sweet. There is no sweetness in leaves, but the thing that has made that sugar and starch was manufactured in the leaves. Over in Peoria they have a process by which they turn corn into sugar in large amounts at the glucose works. In the same way the plant produces sugar. The leaf during the daytime and in the sunshine is hard at work manufacturing a substance, not sweet but starch. During the night it turns about its forces and changes the starch into sugar and sends it down in the stem. That is there as a liquid. This is the laboratory of the plant. That same thing is going on in the apple leaves.

Mr. Tilson: It makes the starch in the daytime and the sugar at night?

Professor Burrill: It can not make starch in the night and can only make it in the sunshine. I have heard talk about some plants going to sleep. They never go to sleep. Some folks say corn grows faster at night than during the daytime; that is the fact.

Mr. Campbell: Why is it that the same variety of apple grown on different trees and in the same soil have different flavors. Take the Ben Davis apple, and I know of several instances where these apples have looked alike but don't taste alike.

Professor Burrill: I was down in Wayne County, Illinois, a few days ago. There were some apples on the table, and I thought I knew Ben Davis apples very well. I looked at a plate of apples labeled Ben Davis. They didn't look to me like Ben Davis, and I asked to taste one, and I did so, and it did not seem to me it was Ben Davis. They were better in quality than the Ben Davis with which I am familiar. They were Ben Davis apples. The difference was in the soil and some other things by which they were surrounded. I am not saying either that apples will not be different on different stalks. The Ben Davis would be a Ben Davis always, and if you take a scion from that Wayne County Ben Davis and put it on a Champagne County stalk it will grow a Champagne County Ben Davis, of the type I am familiar with.

Dr. Preston: I would like to ask what relation the size of a blossom or flower has to the size of the fruit. I have observed the growth of peach blossoms. I have in my yard six trees, and the trees that had the largest fruit had what I supposed imperfect blossoms. The petals on those trees were small but the fruit was large and almost perfect. The trees that had the largest blossoms and the most beautiful blossoms had the most undesirable fruit, small and no account.

Professor Burrill: I have a Bartlett pear tree and a Clapp's Favorite at my back door. The Clapp's Favorite blossom is a beauty by the side of the Bartlett blossom. This is characteristic of the Clapp's Favorite pear tree. I don't think there is any relation between the Clapp's Favorite blossom and that of the fruit produced as correlated or connected. Yet I should infer that the Bartlett that produces large flowers would likely produce large fruit. If the tree was in such a thrifty and vigorous condition as to produce a large flower I should think it would produce large fruit.

Mr. Burton: What has been your experience with bitter rot this year?

Professor Burrill: I am very sorry to say we had a very sad experience. We did a good deal of spraying this year, and it was done just after the leaves came out, just after the petals had fallen. This spraying was done about the closing day of April, and none later than the middle of May. We put a good deal of labor and expense into this spraying. Orchardists that have had no fruit for years looked forward to an abundant harvest. The trees were in better shape than they had been for years. The young fruit held on better than ever. Along in July and August the bitter rot and other rots associated under that head in many cases took the entire crop. One man who had figured he would have 1,200 barrels of good fruit found that he had ten. It was an awful thing. A man in Johnson County, who had been advocating the planting of orchards for the last

twenty years, said he was so thoroughly disgusted with the loss of his fruit after it was almost half-grown that he was talking about cutting his orchard down and raising red-top grass, that is putting it in meadow. So far as I know, there is no settled method of preventing this rot of apples on the trees or after they are picked. One man sprayed with Bordeaux mixture, and he shipped to Champagne some of the most beautiful Winesap apples I have ever seen. I think spraying can be used as a preventive against the rot, but not as a cure.

Mr. Tilson: Are you right certain that the spraying did not cause part of that bitter rot.

Professor Burrill: I would hate to charge it to spraying.

Mr. Tilson: I did some spraying this year, and had the worst lot of apples I ever had.

Professor Burrill: That is an unfortunate condition that has occurred quite frequently. We have a boom in apple-growing in a little place in Illinois called Neoga. It is north of what is usually thought to be the best apple district. There have been several people there who have grown apples for a considerable length of time, and yet one man started in there to cultivate and spread out to the limit of his knowledge. He is a very energetic man, very thrifty in every way, and he certainly has done wonders in his orchard and he has put a good deal of it down into his pocket. Now the neighbors said of him, "Mr. Aldrich is only lucky. He did not spray at all. He has a good crop of fruit, and another man who did spray, has not." That kind of thing happens; but taking one time with another, those who have not sprayed have not got as substantial a bank account as the man who has persistently done it and kept at it. I can not help but think that there are a good many of these things hidden away from us and which we do not see on the surface. Of course the spraying may do damage; it may burn the foliage if the substance is put on too strong and all that, yet still I think it is useful in preventing bitter rot.

Mr. Reed: How late in the season has the spraying been continued in those experiments in Illinois which have been most successful.

Professor Burrill: Right along until the harvest time of the apples.

Mr. Reed: The reason I ask that is because I heard Mr. Stinson's paper on bitter rot in Missouri week before last. It has been successful there, and until the first week in August he had sprayed five times.

Professor Burrill: This man I quoted as having raised Winesap apples, kept it up later than he need to have done.

Mr. Reed: Wouldn't he have to spray every time after a rain?

Professor Burrill: Well, I don't know. The best time to spray is during the rain, but that isn't common doctrine.

The President: That is a new doctrine here. You may have to prove that before you get away from here.

CROSSING AND HYBRIDIZING.

FRED DORNER, LAFAYETTE.

Crossing is the pollenizing of a flower of one variety with the pollen of a flower of another variety of the same species to effect fertilization. Hybridizing is the same action between two species of the same genus. A crossing between two genera may be possible where relative properties exist.

Nature teaches us that cross-fertilization strengthens the vitality and advances perfection in the progeny, while a self-pollenization degenerates. In many plants the flowers are so constructed that a pollenization is only possible with the help of insects, by carrying the pollen on their hairy bodies from one flower to another, or the pollen is carried by the wind. We notice where plants stand in clusters, seed is more freely produced than when standing alone. A solitary cornstalk seldom produces a good ear of corn.

With the knowledge of nature's wonderful and intricate working we are enabled to extract from her what we receive otherwise only by chance. The production of new varieties, improvements on existing ones, in fruit, flowers and vegetables as size, form, taste, fragrance, color, habit, productiveness, beyond the result of good culture can only be accomplished through the seed produced by cross-fertilization.

The most striking illustration we have is the carnation. With a good culture as a basis, and a judicious selection for crossings, greater improvements have been accomplished in the past decade than the century before, when the most achievements in the evolution of this flower had come mostly by chance. What has been accomplished here can be done with any other genus of plants, be they flowers, fruit, or vegetables. In France and England wonderful improvements have been made in the rose; there were also made the initiatory improvements in the carnation, which has come to its highest standard in this country. Germany took the lead in annual and perennial summer flowers, while in fruit the French are the peers.

For illustration, I will give you my experience in carnation culture, and first call attention to some natural laws governing reproduction, favorable and unfavorable to what we want to accomplish in our crossings, mention points to be observed and describe the procedure of pollenizing to effect fertilization.

To make it more comprehensible, we must go back to the original primitive pink, the ancestor of the pink family. To all appearances, the flower of the original pink has been single and of a purplish pink color. Culture made the first improvements; it produced the double flower. This has probably been preceded by shadings in the color; spots may have appeared of distinctly different colors, and then nature's work of cross-fertilization enlarged what culture had effected in the beginning. Varieties developed so distinctly in habit, that they were classified as new species. The remontant or ever-blooming variety originated in France about seventy years ago, and from this type developed our present carnation, much improved in habit and free-blooming. It required centuries to develop our present monthly or ever blooming carnation. Now in our artificial crossing and hybridizing we employ culture, selection and calculation, but we have against us the natural tendency to breed back to its primitive originality and all the intervening stages in its evolution up to the present time. Culture is the fundamental base; neglect it and you will assist the natural deteriorating, the return to its primitive condition, or what we commonly call "running out."

In the selection of the parent flowers we must exercise the utmost care to select the most perfect, as well in the pollen or male parent as in the seed-bearing or female parent. I will give an illustration from my experience in regard to selection and calculation. Ten years ago when I commenced to make my first crossings, I used as parents the best standard varieties then in cultivation. Among these the most vigorous growers we had in the pink, scarlet, dark red, and variegated varieties; the pure white lacked constitution, and a few yellows were weak and shy blooming specimens, and of a very light shade and poor, imperfect flowers. The yellow color was there, and my aim was to produce a clear yellow variety with perfect flowers and a vigorous constitution. The first step was to infuse more vitality, a more vigorous, robust growth. In this I succeeded by making repeated crossings for the next three or four years between the yellow seedlings and other strong growing varieties, but the stripes of the color of the pollen parent were always there, and where they appeared the most I noticed the most improvement in habit, and where I used the scarlet varieties I also noticed that the yellow color became deeper and more pronounced. Now I had some good strong growing and free blooming yellow varieties, but they were all striped. The next step was to eradicate the stripes; this I accomplished by crossing the least striped varieties with the more profuse striped ones, and with some brilliant scarlets, and some mongrel colors between yellow and

scarlet, that appeared with the striped yellow. This I had to continue for several years again, and now at the present time I can show some yellow varieties of a pure clear yellow color, much darker than the yellows of ten years ago, which were rather more a cream, and with as strong constitution as we find in any of the other colors.

To give an idea of the importance of such work, I can truly say that among ten seedlings probably one showed progressive improvements; the other nine went backward; and then I had my selection among hundreds. In all our contemplated work we very seldom succeeded with the first crossing; it generally takes three and four generations to accomplish what we aim for. In general, we may say that probably one in a hundred will come up to the standard of the existent varieties, and probably one in a thousand will be better and above the standard. We recognize nature's law that like produces like, but in a plant like the carnation, that has been for centuries under the influence of culture and cross-fertilization, it will hold good only in a general way, when we consider the results of our crossings. The strong tendency to retain its primitive originality is there and is stronger than the agents we employ to force it away from it, and naturally the results of crossing are very various.

The retrograding results are most plainly shown in the large percentage of single blooming plants, from 25 to 50 per cent.; then we find plants that have lost their ever-blooming quality, with a more grassy appearance resembling more our common hardy garden pink. In color we find the greatest instability; while most plants from the same seed pod will have the color of one or the other parent, or both, there may be a goodly number of entirely different colors. It is not uncommon to see a progeny of two dark red varieties to be a pure white, and vice versa, but when I consult their pedigree I may find that color three, four or more generations back. Then we may find the garden carnation only blooming through June and July, from which our ever-blooming present carnation descended. On the other side we find a few specimens where culture oversteps its function and produces flowers with ten times the number of petals, very large, often measuring six inches in diameter, ragged, without form and beauty. In the structural parts of stem and flower we may find diversities not found in either parent.

Lastly, I will mention some plants where nature refuses reproduction, being imperfect in their sexual organs. Several of my best varieties never produce a single grain of seed, with the most careful and repeated pollenizing, while some others are entirely destitute of pollen but produce seed freely when pollenized. With others pollen is sterile.

The sexual organs of a flower consist of the stamens with the anthers or pollen bags containing the pollen, the male organ; and the pistil, the female organ, comprising the ovary containing the ovules or small unfertilized seeds, style and stigma. The procedure of pollenizing is purely mechanical and very simple. To make a crossing, select the flower that

shall bear the seed, before it is fully developed, and remove all the stamens; this is done so there is no chance for any possible self pollinizing. It is also well in double flowers like the carnation to remove part of the petals around the pistil to give this organ a freer chance to develop and be of easier access to apply the pollen. When the pistil is matured enough to receive the pollen, which can be easily detected with a little experience, apply with a small fine camel's hair brush the pollen with a light touch to the stigma. The pollen is ripe when the anthers burst and lay it bare, and when not too old and dry will readily stick to the brush, the same as to the fine hair of a bee; to moisten the brush by breathing over it will help much to hold the pollen. Fresh pollen is always preferable, than when too dry one or two days old. The morning hours on a sunny day is the best time, and we seldom fail to find fresh pollen at that time. A low temperature and wet atmosphere will prevent fertilization. A matured flower prepared for pollenization retains its freshness and vitality for several days, while pollen will soon be scattered and lost with the slightest touch. I found with the carnation that flowers kept for two weeks and were then yet in condition to effect fertilization and grew seed.

I am not advised to what extent artificial crossing in fruit culture has been practiced in this country. Whether our new varieties of apples, pears and other fruit are results of carefully executed crossings, or found by chance or imported. We have delicious fruit; we have also exquisite flowers, but something new always enlivens the flower market, gives new interest to the lovers of flowers, and we feel a beneficial effect through the whole trade. Will it not have the same effect in fruit culture? It is quite a greater undertaking to grow fruit from artificially grown seed, than flowers in the same way, from herbaceous plants; here we can see the results in a year or two, while in some branches of fruit culture we have to wait three or four times as long. It would hardly pay to grow 6,000 seedling apple trees, like I do carnations, wait six or eight years, and then find probably a dozen that may be better than existent varieties. It would truly be a hard experience to see one-third or more return to the wild crab. Fruit culture is in this respect much the same, as the culture of our varieties of flowers, that have been grown for centuries; we meet the same obstacles to a more rapid progress, the tendency to breed back, a dealing with inferior conditions of long ago. I speak more of the apple, as it is probably the most widely spread. With small fruits results can be ascertained much sooner.

I believe most all of our native varieties of apples, old and new, have accidentally been found in the nursery row among the large number of seedling stock grown for the purpose of grafting. They may have probably attracted attention by some characteristic shown at that age and were saved out of curiosity, or they were probably found in some corner or out-of-the-way place where a stray seed had grown and were left

alone. As I said before, to grow seedlings for the purpose of producing meritorious new varieties on a large scale would be neither profitable nor encouraging. Let us lay dollars and cents and large profits aside, and see if such work on a small scale successfully carried out would not be repaid in the work itself, the pleasure it gives to dive a little into nature's mysteries, and watch and see what you can accomplish, and it may be profitable in the end. Suppose one would grow a few apples in his orchard from select crossings, use the seed of the best specimens for sowing, and keep a correct record of all his crossings. A like number of seedlings can be grown every year to fill another row in the space devoted to that purpose. When the seedlings are ready to transplant, do not plant them in some out-of-the-way place and leave them to themselves. If you can not spare a piece of ground suited for apple culture do not attempt the work at all. A good culture will help and sustain what you want to accomplish, it is imperative. The young trees will not need the space you would give in a permanent orchard. They should have ample room to develop until they bear their first fruit, but give all the care and cultivation a rosarian would give a bed of his choice roses. As your work progresses and you add every year another row to your proteges, when you see them thrive and respond to your careful cultivation, notice their different characteristics, make comparison with their parents with the aid of your record, indulge in suppositions as to what may be the result, see the first blossoms appear, their first fruit ripen, and find probably one, two or three varieties that are above the standard—then you will realize the fascination this work has, and the satisfaction and pleasures it gives. But I say again, this is only work for one who has love for it and feels himself repaid by the pleasure it affords, and let the business part follow.

Now some may ask how to proceed with such work. I will try to outline a way as it appears to my mind, but can certainly be improved upon and suited to circumstances. Make your plans as to what crossings you wish to make and select some branches of easy access on the healthiest trees of the desired varieties that have a goodly number of sound fruiting buds. When the flower buds appear and attain that rounded form ready to break open, select the strongest and healthiest, as many as you will use, and remove the rest. Clip part of the petals away, so as to have freer access, and remove the stamens; this must be done before the bud opens, in order to remove the pollen before it is ripe. When the pistils of the prepared flowers are matured apply the pollen that will be found now abundantly on the other parent tree in the same manner as described before. During the time of blooming it requires the greatest watchfulness to guard against determinal influences until the fruit is set. In the first place we have to protect the prepared flowers from the insects, which, in quest of honey, swarm over the tree and perform unwittingly and promiscuously as arranged by nature, the work you wish

to do yourself to suit your fancy. For protection use a fine gauzy fabric that will not shut out light and air, and enclose either the whole or part of this branch or the single flowers, just as it is most convenient. This will also protect against flying pollen carried by the wind, and if left on during the early growth of the young fruit, will protect against the ravages of winged insects. If the pollenized flowers can be protected from rain, it will be of much benefit, as water will interfere with fertilization. A correct labeling should never be omitted, if one is deeply interested in his work. This is not such an extensive or tiresome work as many suppose it to be, neither complicated; all that is required is timely attention. What can be done in Europe can be accomplished here, too, but one must have love and energy for the work, use his brains and not his pocketbook alone.

CONDITIONS AFFECTING APPLE GROWING IN THE GAS BELT.

MRS. W. L. BERRYMAN, TIPTON.

This subject presents four propositions: Soil, climate, parasites and market. I take it as a settled proposition that some soils are adapted to the growing of apples, while other soils, although fertile for many other plants and shrubs, are not best for apple culture. The apple tree in texture and fiber is more like the sugar, beech and hickory trees than any of the other fruit trees. Hence we would expect the best results from orchards growing on this quality of land. Experience proves this to be correct. The black soil of our level lands, however, under proper treatment, will grow strong, thrifty apple trees, and with fair treatment will be prolific and produce a good quality of apples.

The soil in the gas belt is largely black, alluvial in character, and having at one time been swamp, must of necessity make a very level country. Therefore, there is but little of the high, rolling land known as sugar tree land for apple culture. This condition is against the interest. The black land, however, has some advantages. As a rule it has a good strong clay subsoil and is susceptible of thorough drainage; it is especially rich and refuses meager fertilizing. These qualities are of vital importance; no apple tree can be healthy and productive whose roots are continually immersed in water. Again, subsoil will generally prove a disappointment to the apple grower, no matter how good is the surface, from the fact that the trees will not be properly nourished in the gravel and it will not furnish a sufficient support to protect them from being overturned by windstorms.

The level feature of our country subjects the orchards much more severely to the influences of cold and winds than does one of a hilly or more broken character. This disadvantage, like the excessive moisture, can be remedied by artificial means. A good strong wind-break on the west and north, either of natural or artificial forests, will largely protect the orchard; hence, we conclude that while the gas belt in point of topography and soil is not of the very best for apple culture, its defects may to a good extent be overcome and made to produce. The next environment is the climate. This belt is a quasi prairie country. It is too far away from Lake Michigan to receive any of the salutary influences that orchardists derive from the presence of large bodies of water. We appear to be outside of the snow belt, and it is a rare thing that there is even good sleighing. Northern and southern Indiana enjoy the benefits of more snow during the winter than the gas belt. The temperature in both northern and southern Indiana is more even than in the gas belt, where the extremes of heat and cold follow each other in rapid succession. It is not an uncommon thing in our winter after a few days of almost spring-like weather to have the mercury drop to ten or twelve degrees below zero, and occasionally to twenty and twenty-five below. These cold waves are usually ushered in by a raking wind that calls to one's mind, when aroused at night by the rattling of windows and creaking shrubbery, the night described by Burns in his *Tam O'Shanter*, "Sic a night a chile might understand, the Diel haid business on his hand." It is not only in mid-winter that the apple and embryo apples are injured by the winds like all prairie countries, but we are especially subject to wind storms during the summer. These facts make it important that we not only protect the orchard from the rigor of the climate, and the winds as suggested, but also that fruit be selected that is least subject to injury from these summer storms.

Varieties of trees that grow tall, have stiff, springly limbs and whose fruit grows on a short, stubby stem are much harder to protect from the wind than varieties of the opposite characteristics and whose fruit grows on long limber twigs. The Vandevere and Bellflower are of but little or no profit in this district because of their susceptibility to injury from wind. They are sufficiently hardy to withstand the rigor of the climate, but their physical formation makes them special objects of the sports of Old Boreas. We find the winter varieties that give us the best results to be Ben Davis, Grimes' Golden, Willow Twig and Baldwin. Again by proper care and proper selection of the varieties our climatic defects as well as parasites can successfully be overcome. Yes, the gas belt has her full share of these pests. We have those that attack the tree, and those that attack the fruit. It would make this paper too long for me to attempt a detailed account of them or the remedies against them. I shall content myself by stating in a general way that washing the young trees in strong soap suds and keeping all grass and weeds

from the roots of trees will prove exceedingly beneficial. Proper spraying is probably the best protection to the fruit.

Markets: One of the most important conditions in the growing of any crop is to know that you have a profitable market for it when produced. The diamonds, gold and precious stones as described in Haggard's story of King Solomon's Mines were of but little value to those who were locked within that subterranean vault. There was no market for them, they could not be utilized. The farmers of the gas belt have heretofore felt much the same about apples. Accustomed to farming on a large scale and selling their products in bulk their education has been against retailing or peddling any of their farm products. With the present condition of the apple orchard of this district, this peddling was necessary if the surplus was disposed of. A large per cent. of the inhabitants of this district came directly or indirectly from southern Indiana, Kentucky and Virginia countries, where the orchard nestled behind protecting hills which gave tree and fruit alike immunity from the destructive forces of the wind and cold. They came to this country with the taste of their luscious Vandevere, Bellflower, Rhode Island Greening of their boyhood home lingering in their palates, they consulted those tastes and not conditions when selecting their orchards, and failures necessarily followed. The conclusion was at once reached that this was not an apple growing country, and therefore those setting out orchards at all put them out only with the view of producing apples for domestic use. I regret to say in most instances those orchards were planted without regard to proper methods and were largely left uncultivated and uncared for; like "Topsy," they just grew. "Scientific" and high class farmers that fully realize and appreciate the advantage of thorough drainage and fertilizing our soil in order to reach the best results in other crops seemed to think that an apple tree should thrive on wind and water and totally neglected to drain and fertilize their orchards. Let me again emphasize at this point the importance of fertilizing. Throw in your orchard all classes of fertilizer that would make your land produce an abundant wheat crop, feed your trees and feed them well, and they will repay your kindness. These conditions have not stimulated the market in this belt.

Buyers go to the locality to purchase commodities where such commodities are produced in large quantities and of high quality. It is no unusual thing in this belt to find commission merchants from Boston, Buffalo and Chicago and New York buying herds of cattle and horses. The same inducement in apples would bring the commission merchant to purchase apples. This is not theory; it has been demonstrated. In my own county we have but one extensive apple grower. Mr. John Puckett, who is one of our largest land owners as well as one of our most successful farmers, has about twenty-five acres in orchard. I only

know the result of this orchard financially during the last two years. Ninety-nine was only a fair crop. This year it was meager. He sold in '99 his crop to a commission merchant and delivered in the orchard nine miles from the shipping point, and received something over \$1,700 net. This year he sold in bulk and delivered in the same way, receiving something over \$400. No quarter section of his choicest land used for agricultural purposes has yielded such results during the last two years. The apples he produces are Ben Davis, Willow Twigs and Baldwins. It is easy to see that apple culture even under our adverse conditions, with the many cities in the gas belt, Indianapolis and Chicago for markets, will pay. There is ample room for eighty trees on an acre of ground. With a general yearly average of four bushels to the tree, which is a conservative estimate, gives a yield of three hundred bushels per acre. These at the low price of 25 cents per bushel in the orchard brings a yearly rental of \$80 per acre, and your land is worth almost as much per acre for pasture as if the trees were not upon it. When the same push, hustle, intelligence and enterprise is put in the apple industry in the gas belt that is expended in other lines of business in that locality the apple culture will be profitable.

On motion of Mr. Swaim, the President of the Association is empowered to appoint a delegate to attend the American Pomological Society.

The following discussion was made by Amos Garretson of the paper read by Mrs. W. L. Berryman on the conditions affecting apple growing in the gas belt:

DISCUSSION.

In discussing the excellent paper, one hardly knows where or how to begin.

She says we may expect the best results from apples grown on sugar, beech and hickory soil; this I think is true with most varieties of apples. My soil is mostly sugar-tree soil. I have a row of Stark trees across the orchard. At one end of the row the land is higher, gravelly and naturally dry. The other end of the row is of black burr oak land, clay subsoil, naturally wet land, but well underdrained. We get as many apples from the tree on higher land as from the tree on the low land, but not more than half the number of bushels, and they are not worth more than half the price of those on the black land.

I think one should be very careful in planting an orchard, to set trees that would be best adapted to his soil. The lady says the Vandevere and Bellflower are of very little or no profit. Why is this the case?

The Vandeveres of forty years ago were always loaded. The oldest trees I know of now are Vandevere over fifty years old, and they bear

good crops with the poorest kind of care. I do not know of Vandevere trees of ten to twenty years that are profitable; have often wondered why it is so. In Mrs. Berryman's selection of winter apples I think she has omitted two of the very best varieties—Jonathan and Stark—both of which do well on black burr oak land.

The plan of washing young trees, and the old ones too, with strong soap suds, can not be too strongly emphasized. I have had experience along this line, and know it makes the trees look like they had put on a new Sunday suit. The majority of farmers in the gas belt, yes, nine-tenths if not nineteen-twentieths of them, think it will not pay to set an orchard; they say if it is a good year for apples, they are cheap; if a poor year, it does not pay. So he gives his attention to corn, hogs and cattle, or corn and wheat, and sells the grain. It is my opinion that the tenth or twentieth man who sets an orchard with the best varieties adapted to his soil, and takes the best care of it, giving proper pruning while young, and every year thereafter, keeping the land well fertilized, thorough and continuous shallow culture, will find that money does grow on trees. Our friend has just demonstrated the fact that a good crop of apples at the very low price of 25 cents per bushel would bring a yearly rental of \$80 per acre, all that the land is worth for corn, wheat or hay. I can not quite agree with Mrs. Berryman in her statement that the land is worth almost as much for pasture as if the trees were not on it. While this may be the case, it would certainly be a detriment to the orchard to pasture it. In fact, I think an orchard should not be in grass of any kind unless it is occasionally set in clover, let grow and seed, then plowed under the following year.

It would not do for us to plant large commercial orchards, or we would surely overdo the matter, which is but natural for us American people. A few years ago you could hardly run fast enough to give away a small (or driving) horse, now a good driver is in demand. The same can be said of beef cattle, Shorthorns, Herefords, etc.; in a few more years they will take another tumble. Why? Because a great majority of the farmers will jump into what pays best at the present time. This will not likely be the case in apple growing, as it will require much study, great care and lots of patience, and but few there be who will follow it.

Prof. H. E. Van Deman addressed the Society, and extended to them an invitation to make an exhibition of Indiana fruits at the Pan-American Exposition in 1901, to be held in Buffalo, New York.

SITE, SOIL, SELECTION OF VARIETIES, PLANTING AND CARE
OF AN APPLE ORCHARD FOR THE FIRST TEN YEARS.

PROF. W. J. GREEN, OF THE OHIO EXPERIMENTAL STATION.

I do not know just how you feel in Indiana, but in Ohio they want us to present something new every time. I can not give very much that is new. Perhaps I might call that a good excuse. There hasn't been any discovery in recent years that you might say is strictly new. There are a great many differences of opinion, to be sure, but I must content myself to thresh over old straw, and all that I can hope is that I may throw out a few ideas which may be helpful to some. The soil and site of an apple orchard are important questions, but if a man is going to plant an apple orchard on his own farm he has not a great deal of room for choice. He is confined to such soil as he has, and the only way he could do otherwise would be to buy a new farm on which to plant an apple orchard, and not very many are disposed to do this. Yet it is a matter we can not neglect very well. If a person has not got the right kind of soil and does not choose to buy a farm for that purpose he had better not plant an apple orchard, at least not for commercial purposes. It is not an easy matter to define just what kind of soil is best for an apple orchard. The fact is that apple trees will thrive on a great variety of soils, a greater variety than we commonly suppose. There is really more in management than in soil after all. I would choose high, well drained clay ground, if possible, one that will grow good wheat. What has been spoken of as sugar tree soil is usually about the best kind of soil for an apple orchard. With regard to the site, it has been in the past almost the unanimous opinion that apple trees ought to be planted on high or lofty sites, but that opinion has been modified considerably. I am sure I would not undertake to make a general statement with regard to this matter, because I have seen good apple orchards planted on low lands, on lands of medium elevation and on high lands, and all doing well, and I have seen them planted in all kinds of locations doing poorly. Yet we can not neglect to do the best we can in the selection of both soil and location. I think there is but little doubt that apples color better on high land, and there is but little doubt, too, that they are later in ripening and hang on the tree better on rather low land. There are some varieties, like the Rome Beauty, that seem to be particularly adapted to high land, and must have a high elevation to do well, and yet since the advent of the spray pump we can raise fruits on lands that we could not before, especially on low, flat land. Speaking of the Rome Beauty, it is very subject to black spot on low land. In fact, in southern Ohio it has come to be the common belief that the Rome Beauty

can not be grown except on hilly land. Since the advent of the spray pump we have had to modify these views. We find it growing in a great many places where we formerly thought it would not grow. There are some things, however, I believe it is well to avoid, and the first is land that can not be well drained, and I would much prefer soil naturally well drained to soil which I am compelled to drain. If we can secure good drainage by artificial means, that is next to natural drainage. I need not say much more about drainage, because it has been talked of so much we all thoroughly believe in it. I will speak of one thing that may be new to some of you—at least you may not agree with me. I believe that we have made a mistake in the past in planting orchards too often on dry soil, or soils where the moisture was deficient at a critical time in the life of the tree. I believe that a great many of our orchards when planted on high locations have perished, not only in winter but in midsummer. My attention has been called to this particularly because of some experiments that have been made along the line of cultivation. I have seen orchards completely killed by drought in the winter time, trees planted on high and dry soil where they couldn't get sufficient moisture when the ground was not frozen, but when the ground was very hard frozen they couldn't get any at all, or at least not sufficient to keep them alive. Orchards have perished in this way in southern Ohio and other parts of the State. All over our State comes complaint about apples ripening too early in the fall. It seems that they always think each season is an exception in that particular. Then comes the complaint that they don't keep well. They are dropping from the trees too early, and then when put in the cellars and storage rooms and having ripened prematurely they begin to decay. I am positive this is caused very largely by the planting of our orchards on very high and dry land and neglecting to take care of them. The reason I think so is that in our orchards, where they have been cultivated properly, the fruit does not ripen so early as where the trees are not cultivated. If the cultivation has been kept up during the season and through the dry and critical time we find that fruit does not ripen so early, that it hangs better on the trees, and in consequence it keeps better. We have, in Ohio, one case in particular where a large orchardist practices mulching on a large scale, and a number of others who do it on a more limited scale. I know of one orchardist having forty acres in apple trees which he mulches. He planted the trees in an old pasture. He didn't plow the ground. He believed that he could plant his apple trees in this pasture and grow them as well as he could by means of cultivation. When I first saw the orchard I was quite confident he would not succeed. These trees when I first saw them were about six or seven years old and they were not as large as trees ought to be at that age. Yet they were in a good, healthy condition. In planting his trees he began in the fall and winter, whenever he could work, and dug a large hole, throwing the soil out in a heap. He did so in order to expedite

matters in the spring and because soil thrown out in that condition would be dry very early. He began planting so early that sometimes when he went to plant a tree he would have to bail the water out of the hole. Then he set out the trees and enlarged the hole to about five feet across. Then every year he dug up the soil and kept it clean. Soon, however, he began to mulch with coal ashes. He mowed the grass between the rows of trees and took it away. When the trees got about ten years old he began to think that was not a good plan, that his trees needed not only a little more fertility, but he was taking too much away from them and he couldn't expect good results.

A Member: What kind of grass was that?

Professor Green: Blue grass.

He wrote and asked if I thought it best to mulch the trees. He said he had got about to the end of his string. He felt that something ought to be done. He asked about mulching, and I told him I thought it would do, but I thought he must keep it up if he once commenced it, and that he could not leave it off, at least not all at once. The result has been in that case remarkable. He not only secured large crops, but he has taken care of his trees by spraying and in other ways. His apples always hang on longer than on any other orchard, and I do not believe there is an orchard in Ohio doing any better to-day. Last year he got seven thousand bushels from trees mostly about ten years old. This year he got four thousand bushels. Of course he got good prices, for the apples were large and fine. Last year there was a heavy wind that blew off a large number of apples in the State. Last fall the Galveston storm swept through his orchard and blew off about three hundred bushels. His apples do not mature like other apples. They hang on the trees until late, so late that hard frosts come before they are picked. This makes me think that our apple trees are suffering for want of moisture and that causes so much premature ripening and early decay of fruit. However, I would not attribute it all to that. In selecting a site for an orchard I would avoid all high and dry locations unless I expected to adopt means to correct the deficiency of moisture.

Professor Van Deman: What do you use as mulch, and do you cover the entire surface of the ground?

Professor Green: He simply mowed the grass between the rows of fruit trees and threw the grass around the trees as far out as the limbs extended.

Professor Van Deman: The rest of the ground is in grass?

Professor Green: It is all in grass, but under the trees there is no grass; that has been killed off by the mulch.

Professor Vand Deman: Does he pasture?

Professor Green: No, sir.

The President: Why don't he cultivate it instead of mulching; is it rolling?

Professor Green: The ground is somewhat rolling, and part of it he could not cultivate. He believes that cultivation is not best on this soil.

President: Where is that?

Professor Green: That is Mr. Vergon, of Delaware.

I might say with regard to this orchard that it is located on soil that would not be considered the best for such a purpose. It is about twenty feet above the river, not on high land. He has done some underdraining, but not a great deal. I am not prepared to advocate Mr. Vergon's plan of not doing any cultivation. However, if I had a site suitable and in the timber I would just as soon clear off the timber and plant apple trees without attempting to clear up any more than cutting the timber down, keeping the sprouts down and plant the trees and follow Mr. Vergon's course as any other. It would depend upon the kind of site I had. I believe, however, that in most cases it is safer to follow the plan of cultivation. In most cases we have to take land that has been tilled for a greater or less length of time. In that case we must prepare first by thorough drainage, if we haven't natural drainage. One good plan is to put a row of tile between each row of trees, having as many rows of tile as of trees. Sometimes it is enough to have half as many rows of tile as trees. Surface drainage is not as good as tile. The reason surface drainage is objectionable is because the land washes, and because it does not aerate the soil in the same manner as the tile. Surface drainage is just a little better than nothing, but not very much. I don't think subsoiling is worth while in an orchard; it does not last long enough; the effect is only transient unless we can follow it up from year to year, and unless we do that I don't think it is worth while to go to so much expense in preparing the soil for an orchard. Tile draining I believe will do all that subsoiling can do and more. If I had land suitable for growing wheat or corn I would not think it necessary to prepare that land for an orchard to fertilize it in any way, and yet there might be a difference of opinion with regard to this and much would depend on the soil. If the soil needed fertility to grow the trees, of course it must be supplied. If you can not get barn manure, the next best thing is bone meal and muriate of potash. We ought to fit the land as thoroughly as we can with a plow and harrow. I need not say more on that topic, particularly. The selection of trees is an important matter and a very difficult one. In the first place we have got to depend largely on the nurseryman, not

only upon his honesty, but his carefulness. The most of us have had experience in buying trees, and we know it is very hard to get trees true to the name, and I believe in a great many cases the nurserymen themselves don't know whether their trees are true to name or not. Of course, I do not mean to cast any reflection on anybody, but it is a hard matter to keep trees true to the name in a nursery. With most varieties we can tell from their appearance whether they are true or not. However, after all we have got to depend very largely on the nurseryman. So far as honesty is concerned I believe that most of them are honest enough, knowing it is to their interest to have the trees named correctly, and I believe we can rely fairly well on a great many nurserymen. All we can do is to simply find out some nurseryman who we think is reasonably honest and trust the matter to him, and in case we find there is a mistake then we can resort to top grafting when the trees are young, or as some prefer they would take the trees regardless of the name or variety, simply getting some good hardy stock to graft on, and when the trees are one or two years old to top graft or bud them. This, of course, has some merit, but whether it is the best for every individual or not depends on the man more than anything else. I shall not advocate it, and yet in my own work I shall practice it considerably. I would take apple trees two years old—you can not follow the rule strictly because varieties differ a good deal. I would take a tree five or six feet tall, and yet I wouldn't be too particular about the size. I would not like to have a tree more than three years old, and, as a rule, I would rather have it two years old than one, because the hired man doesn't have as much respect for the small tree as the large one. He is more apt to run over it in cultivating the ground or injure it in some way, because he is not so apt to see a small sprout as he would a larger tree. In preparing the tree for planting I would prune it severely, both root and branch. I am not prepared to adopt Mr. Stringfellow's plan altogether, but I do not believe he is altogether wrong. Long before I heard of this plan in the nursery we found that we almost always had some stock we could not use and had to plant it out. Nursery men do not do that very much any more, because it is not so necessary as it used to be. The trees were worth more then and frequently we planted trees out in rows to save them. The roots were cut short as well as the tops, and almost all the root. I knew that long before I heard of his plan. Yet while I know that trees can be pruned in that manner, taking off all the side limbs and roots and not leaving them more than an inch or two long, I am not prepared to advocate that plan. We seldom get a tree from the nurseryman started as it should be. That is the orchardist's business. I would prefer cutting away all the side branches. We ought to do this carefully.

Mr. Garretson: How many limbs do you start out in forming the top?

Professor Green: I couldn't give any rule for that, but I would say, do not let too many limbs start out on opposite sides of the tree.

I shall not say very much about methods of planting. That seems to me too well known to need very much discussion. The distance between the trees is a matter of a good deal of importance. There are two plans we can pursue. We can plant the trees as far apart as we expect them to stand when they get to bearing, or we can put trees between as fillers. There is a difference of opinion as to which plan is the better. I am sure I can't say. I have thought sometimes I would follow the plan of setting out fillers, but knowing my own weakness I don't know whether I should. I don't like to advise other people to do it. I am not so sure after all if you are going to cultivate all the land between, if you put your trees thirty-five or forty feet apart and you utilize the soil to the best advantage by growing crops between, but what you can make as much money this way as to use fillers. If you want to use fillers you can do so, provided you take them out at the right time, and you can plant varieties like the Missouri Pippin, Rome Beauty, and Ben Davis, or some of the earlier fruiting kinds, and you can take out these trees when they are ten or fifteen years old and thus not do the permanent trees any harm. The chances are you will leave the fillers several years longer than you ought. I think every person ought to know how much backbone he has before he sets out fillers. The distance must be varied according to the soil. In southern Ohio you can plant apple trees safely twenty feet apart. You have to be governed according to the soil. It is safe to say that a good liberal distance according to the soil gives better results than crowding. I like to plant the trees a little nearer one way than the other because you will find when the trees get pretty good size you will have difficulty to get between them with a spray cart. It is very likely we will find means of spraying within a very few years wherein we will need more room than we do now. We find in orchards planted thirty-two feet apart there is not room to spray properly, and when we get larger machines for spraying I think we will find we will have to have more room. There should be a good liberal distance between trees, according to the soil. The pruning of a young apple orchard is one that a person must study pretty carefully. I don't know how we can lay down any rules for it. I know, however, that a little neglect for the first two or three years may cause some trouble in the future. The first year after a tree is planted you must attend to the pruning with a great deal of care, not only in cutting off the surplus branches, but to see that you get them located where they ought to be. You should go over your trees time and time again. You will find the time spent then is time saved in the future, and that it is of very great benefit to the orchard to have the trees started right. It is a matter that can not be explained. You have just got to study it out and know what you are doing. You have got to look to the future, you have got to be able to see into the future of the tree, and you have got to have experience in order to know how to

prune your trees. The amount of pruning that you have to do is not very large if it is followed up every year. You should not allow everybody to saw limbs from your trees. You can not lay down any rule for pruning all varieties of trees. Trees should be pruned with a view of getting at the trees to get the fruit and to do the spraying. Since spraying has become common, pruning is more important than it used to be, because you can not do spraying properly unless the trees are well pruned. We should not get into our heads the idea that pruning has some special virtue. The limbs are not cut off for the benefit of the tree particularly, but they are cut off for our own convenience. A few years ago an old gentleman who had considerable horticultural experience came to me and said, "I would like to prune your young trees; I see they need it." I said, "Of course they do. If you understand the work well I would as soon let you do it as anyone;" and without giving him any instructions I let him go to work. I came around in a short time, and he was doing a fine job. He had pruned off all the spurs along the limbs. I said: "That does look nice, but it won't be very long until nature gets to work and undoes all you have done." He said, "What do you mean?" I said, "Those limbs ought not to be left bare that way; it is not natural nor right. Leave the little spurs on. All I want you to do is to start these trees right, and I don't want the little spurs trimmed off. It looks well, but it is doing harm." He had an idea that the more cutting he did the better it was for the tree. Spraying I believe is important in the young orchard. We have been growing our trees now for seven years, spraying some and leaving part of them unsprayed. We can not see any very marked improvement except in one thing, and that is, the trees sprayed look as though they have been washed with lye. The bodies are clean and smooth and the trees look healthier than the others, but the growth is no greater. However, this year when the trees began to bear, those that were sprayed bore better fruit than the others. I would not go to the extreme. I use the Bordeaux mixture and the arsenical mixture. It don't cost much to spray your trees, and you can do it quickly. As to fertilizing, we can not lay down any rule. One can not say whether trees should be fertilized or not unless he knows all about the conditions. On land that has sufficient fertility to grow a good crop of wheat or corn I can not see the use of having fertilizers until the trees commence bearing. Fertilizers that you use should not be very rich in nitrogen. You had better have a good supply of phosphoric acid and potash than nitrogen. Every one must be governed according to the needs of the tree as he sees it, and he can very easily see when the trees need fertilizing. I believe it best to cultivate a young orchard from the time it is planted up to the time it is ten years old. Don't stop cultivation before ten years. It is just as well to grow crops between the trees as long as you can get any crops that are worth anything.

Professor Burrill: What kind of crops?

Professor Green: Corn or potatoes. These are about the only ones; but in case the land needs more vegetable fiber, then you will have to plant something to plow under. If the trees are in need of more nitrogen, then you should plant some leguminous crop. You can't lay down any rule. For four or five years you can just as well plant crops of corn and potatoes, and after that you can keep up the cultivation, but I would not advise leaving the land bare in the winter time. I would have some cover crop to protect the soil in the winter and plow it under in the spring, and don't neglect to plow it under early. You can sow a crop of rye and let it get pretty near full-grown, and plow it under; but it is likely to do more harm than good, because it robs the soil of so much moisture.

Professor Van Deman: Do you use vetch?

Professor Green: We do not succeed very well with vetch.

Mr. Garretson: Would a crop of late potatoes go well?

Professor Green: Yes, you can do that.

Mrs. Stevens: What would you do with potatoes in a hundred-acre orchard?

Professor Green: You would have to raise 100 acres of potatoes. I think corn as a better growth for the first year than potatoes. Really there is not a very great variety of crops that you can raise in an orchard, and the fact is we can not get profitable crops very long. After that you have to simply grow a cover crop and plow it under in the spring. The cover crop must be chosen as to whether you want to supply fertility or whether you simply wish to keep your soil covered during the winter and plow it under for the purpose of having vegetable fibre to the soil. You will have to be governed by this according to the kind of land you have. Unless you have made a good foundation for an orchard you can not expect to have any success from the tenth year on. So much depends upon the first years of the orchard that one ought to study it thoroughly in all aspects before undertaking to plant an orchard. You will notice I have said nothing about varieties. I might say something about varieties adapted to Ohio, but I can not say as to Indiana.

Mr. Johnson: What do you think about plowing in a young orchard planted four or five years, and in getting close to the trees?

Professor Green: In plowing young orchards for the first four or five years I would rather use a disk harrow than a plow. We use a spring-tooth harrow in connection with a disk harrow a good deal. You can not

plow the ground with a common turning plow to any advantage unless you plow toward the tree on one side and from it on the other, and the next year reverse that order.

Dr. Collins: You were speaking of pruning an orchard for convenience; don't you prune it also for the size of the fruit?

Professor Green: Yes, it has an effect also on the color. I want to emphasize the point that the mere fact of pruning does not add to the longevity of the tree.

THE APPLE ORCHARD FROM TEN TO FIFTY YEARS.

J. A. BURTON, ORLEANS, IND.

I am pleased to receive an orchard that has been in such able hands during its first ten years. I trust I shall not lower its standard, or give the just critic occasion to remark what it might have been had Professor Green continued in charge. I shall expect to find everything as it should be; trees standing straight or leaning a little to the southwest, headed at proper height for each variety, trained with a leader and all branches tending outward, an open head to admit sunlight and facilitate spraying, and bearing spurs down each limb to body of tree; ground left level and preferably in clover; trees of good varieties. If, however, the trees have not been trained just after my style, I would not attempt an abrupt change. Very few trees in my "now" orchard are just what I would have them. A flaring head I would open up and grow bearing spurs on remaining limbs. If unprofitable varieties have been planted, would top work or dig out. Can't afford to waste time with useless trees. Would keep heads well in control; that is, would not let them spread so wide as to interfere with their neighbors nor grow so tall as to be difficult to spray or gather the fruit. Would trim carefully each year, keeping heads open. Would spurn all statements that a man should be able to carry at one load all limbs that should be cut from a tree during its life. Would try to avoid cutting large limbs, but if I thought they needed cutting would cut them.

My cultivation will be entirely with the spade and smoothing harrows, unless it is to destroy some vicious weed or bluegrass sod. This is the most expeditious way to cultivate, and to my mind the most successful. I do not want clean cultivation in my orchard, but enough growth of clover, peas or weeds to prevent washing. This rubbish I want mixed up with the soil by the spade. Would cultivate both ways in April, May

and June, working last cultivation with smoothing harrow. If land was rich as needed, would let it grow wild grasses and mow when getting too rank. If not rich enough would sow cow peas at last cultivation and hog down when ripe enough.

With a thoroughly good pump would spray when buds begin to swell. As soon as the wind changes, spray from the other side. I term this one good spraying. Spray again just before blooming, and from both sides within one week after blossoms drop. Would make the last two sprayings very thorough, as they are to determine the absence or presence of the codling moth, and that means whether I shall or shall not have apples.

Would thin severely. Never let a tree overbear. If a tree can support only five bushels, better that these five bushels consist of 700 rather than 1,200 apples. It is probable that a small apple will exhaust the tree as much as a large one. The selling price is very much in favor of the large apples. Thinning can be done much faster than is generally supposed. The longer an apple remains on the tree the better it will keep, and the better its color and quality. But they may fall badly near the ripening period, causing much loss. Therefore when they have colored properly would gather as soon as possible.

Then comes the job at which few have the courage to do their duty. Why should I hesitate to grade my apples as I please? I have the same amount whether they are in one pile or four. Don't I know that a rotten apple will never be sound, and that a speckled one is likely to soon be rotten, and that a knotty one never can be any account if it does keep? Only sound apples can be expected to keep. Sound apples will sell for more if assorted into two or three grades. Would sell the speckled ones for whatever price I could get. Some people will buy anything that seems to be cheap. One man with a farm worth \$20,000 has done without apples all winter because he could not learn when I had speckled ones to sell at 25 cents. Another that gathered for me at \$1 per day took one barrel fancies and two No. 1's. What kind of apples or butter one will buy depends on taste, not wealth.

Would sell my apples as soon as I could find a fair market. Generally the loss from shrinkage and decay is greater than the advance in price. My best market is the home market. Next the small towns, and the final dumping place, even though I may get no returns, is the city.

Professor Taft of Michigan: It seems to me that the essays this morning are pretty hard to follow because they cover the subjects pretty thoroughly. I agree with the papers regarding the cover crops. We have used in Michigan for a number of years another crop which in some cases seems better than any of those mentioned. With reference to the rye and clover, they frequently trouble us in drying out the ground in the spring, and make plowing practically impossible on heavy soils. We use the common oat. I don't know how the oat would thrive with your soils, but we can

break the land after the first of August or the middle of August if we wish, and then seed it with this crop and get a good growth in the fall. It is a good cover crop, and in the spring it makes a good mulch. Of course the oat does not supply nitrogen, but as a cover crop and mulch it seems to be one of the best crops we have.

Mr. Kingsbury: When do you sow it?

Professor Taft: We prefer to wait until about the first or middle of August. We can sow the oat in Michigan until the middle of September and get a good crop.

Mr. Kingsbury: Would that be possible in our climate, could we grow oats sowed at that time?

Mr. Jesse Stevens: I have listened very carefully to these two papers this morning; for forty years I have been a student of what we have heard discussed here this morning, and I am frank to say to you that I have got to be a confirmed infidel. My friend Burton talks about education to raise apples. He can't raise corn. I can raise in my orchard corn enough to buy his place and have surplus left. I spent thirty-five years of my life trying to raise an orchard. I have spent hundreds of dollars where some of my neighbors have spent dimes, and I have never succeeded in raising a decent apple, and I challenge any man in the State of Indiana to do it. You can bring a spraying factory on the ground if you want to. I can raise brush, and I don't have to manure it either. We heard something about a list of awards at the Paris Exposition. I know every man named in that list. I have visited their orchards myself. I know the finest apples I ever saw in my life came from orchards owned by men too poor to raise a disturbance. I know that those apples which were produced there and which have attracted the attention of the world and have advertised Indiana, were raised on soil that has never been cultivated. I saw this fall specimens of Vandevere and Yellow Bellflower growing on trees fifty or seventy-five years old. I have come to the conclusion that there are places in Indiana adapted to the growth of apples, and there is where we should grow apples, but to take my farm and set it out in apple-trees, I will guarantee you that you will go into bankruptcy. Every one of those names represented in that Paris award are names of men who have land adapted to apple-growing. I have seen some apples growing there as seedlings in the fence corners which would do to exhibit at the State Fair. We must select the business our soil is adapted to. Some of us should raise hogs and some corn and some apples.

Mr. Tilson: We find almost everybody good for something. I am satisfied that an orchard ought not to have anything growing on it, a young orchard, up to August. Any crop you put there will take the moisture from the ground and from the trees. The ground should be broken up in

the spring and thoroughly dragged. If you want to put anything in it in August, that will be all right. I am surprised that they will sow oats in Michigan in August. I believe that in sowing corn or potatoes it won't pay you for the moisture you take out of the ground. I am an advocate of the dust mulch. It will hold the moisture in the ground.

Professor Van Deman: I was very much interested in the statement of Professor Green regarding that orchard in Delaware, Ohio, the one which has been grown from the start without any plowing or cultivation, and nothing used except mulching. Nature mulches every tree she plants. There is not a forest in the world from the arctics to the tropics but what is grown on the mulching plan. When we plant apple orchards or any other sort of orchards, mulching in a measure becomes impracticable because we can not get the mulch cheap enough. I thoroughly believe that if an orchard could be well mulched from the start, and never cultivated, it would be all right, but as Professor Green has said, when you commence to mulch you have got to keep it up because the roots of the trees are near the surface and just underneath the mulch. If you would plow in there among those roots you would tear them all to pieces and ruin the orchard. I do not think the mulching plan is practicable. The cheapest thing to do, it seems to me, from my own experience and observation in many States, including Indiana, is to follow the system of thorough tillage, and force the roots to live in a substratum instead of on top of the earth. The drier we can make the top soil the more moisture will be in the other. The more dust on top, the less inclination the root will have to go upward and the more to go downward. We know that to be true in the cultivation of all kinds of fruit and farm crops as well. So it seems to me we can not reasonably accept any other theory of orchard culture as being practical in a general way aside from that which includes thorough tillage. The matter of tillage is one which is occupying more and more attention by the fruit culturists of the country, the orchardists particularly, and in peach culture also. Of course the subject under discussion is apple culture. This method of unceasing culture, beginning early in the spring and stirring the ground with implements is the plan of Mr. Morrill. I have seen in his orchard the weeder used to great advantage. He has a light sandy soil and it is different from the soil of Indiana, and that cultivation with the weeder was so cheaply done that it scarcely cost more than five cents per acre. I talked with one man who ran that weeder. He said that if rains didn't interfere he could cultivate seventy-five acres of peach orchard twice a week once each way. If we would double the cost and make it ten cents per acre, even that would not be a very expensive orchard culture, and Mr. Morrill's results speak for themselves. He took in over \$35,000 from his peach crop of fifty acres in 1899. Of course that was an exceptional year because it was a very scarce peach crop. His neighbors said that he would bankrupt himself cultivating that orchard, but in that severe winter two years ago his trees

went through it in a good condition, while many of the trees belonging to his neighbors were killed root and branch, some down to the big limbs and others not quite so much, and nearly all of them had their fruit buds killed. Mr. Morrill had a good crop of fruit. The orchards in southern Missouri are taken care of, and instead of beginning with the plow they begin with a Morgan spading harrow. That is one of the best tools I have ever tried. It digs up the ground thoroughly, but it makes the horses pull. You can not do any sort of work in the ground without making labor for the horses. Whenever you talk about a plow running easy you are not doing much good. Give me a plow that runs hard and I will show you soil that is pretty well stirred. Mr. J. C. Evans has told me how to do it repeatedly. The Morgan spading harrow is one of the cheapest implements. They begin with that in the spring and they go alternately in two directions until they have gone over that ground five times, and that is five cultivations. Those five cultivations cost exactly the same as one plowing, and I leave it to any reasonable man in this audience if those five cultivations are not worth more to an orchard spread over a number of weeks than once plowing. Then just before the last cultivation, which is along about the middle of July and sometimes the last of July, and even as late as the first of August they sow cow peas. They let them lay until fall, and then they turn in the hogs and let them harvest the crop. They fatten a good many carloads of hogs with these cow peas. Thus their orchards are kept practically in good condition. In reference to fertilizers we want to avoid the use of chemical fertilizers as much as possible, because they are too expensive. Sometimes, however, it pays to expend a little money in order to get more out of our soil. When a tree is not making its growth that means nitrogen. A foot of annual growth should be found on every orange apple tree. Phosphoric acid and potash are orchard manures more particularly than nitrogen. You can overdo the nitrogen business. I have known that to be done, particularly with the peach. If you are going to put in chemical manures there is none better than muriate of potash and dissolved bone. I prefer the dissolved bone to bone-meal. The dissolved bone is treated with muriatic acid. Another commercial fertilizer is called phosphate rock. Some people don't know what it is. These phosphate rocks are simply the fossil remains of prehistoric animals that have by some means become deposited in beds. They have become mixed with other manurial elements and have formed a sort of rock. When we use this we are using the bones of animals that lived a long, long while ago, instead of the bones of animals that walk the earth to-day.

Mrs. Stevens: In southern Indiana we use orchard grass. It forms a mulch. Our trees are doing splendidly. I would like to know if we are making a mistake in this. We have time to change it if we are, but we hope we are on the right track.

Mr. Kingsbury: With reference to the orchard of Mr. Newby I want to say that I have been in that orchard, and if I am any judge of a good soil I would say that his orchard is planted on first-rate soil. The grass is growing between the trees. He leaves his orchard uncultivated. The grass is blue grass and it grows very rank and tall. He says the grass is a good thing for the trees. He mulches in this way and keeps the ground moist and in excellent condition, and has probably the finest apple orchard in the State. He has the greatest variety, and a very fine quality of apples.

The President: In explanation of Mrs. Stevens's remarks it is well to bear in mind that the orchard she is referring to is planted on very rolling land, and constant cultivation is impracticable. Mr. Burton grows clover in his orchard. His land is quite rolling.

Professor Van Deman: There is one thing I forgot. In the State of New York, Mr. J. S. Woodward, at Lockport, is one of the best orchardists in the State. He believes in keeping the orchard in grass and using sheep. He says he does things that will be very dangerous for anybody else to try. He feeds the sheep grain and bran and other things, and he puts into the orchard manure instead of taking something from the orchard and putting it into the sheep.

Professor Burrill: I do not own a foot of soil in which commercial orchards are planted. If there is any one speech that I should like to have framed this morning it would be Mr. Stevens's over here, provided I believed it. I have heard that story before, but I never heard it so well told. I believe it is entirely possible to put enthusiasm into this Society and into the fruit-growers of Indiana until this room will not contain your Society, and so that the State will hardly contain the enthusiasm of the people living in it. I don't think we are any smarter in Illinois than you are in Indiana, but I know some who have done better than \$50 an acre on an average, year in and year out, for the past five years, and those years have not been especially good apple years. Yet there have been a lot of folks that have not done anything at all. I have this year been through our best apple-growing regions of Illinois, and there isn't one-twentieth part of those orchards that have been taken care of. There is only one here and there. We have gotten far enough along to know that if we are going to get a crop we must pay attention to that crop. And we know that the same thing is true of the orchard as well as the cornfield. I believe that these hills of Indiana and the flat stretches of prairie between are yet to become celebrated as the land of the big red apple. I would like to ask Mr. Burton how much of a glut there is of the market for Grimes' Golden apples.

Mr. Burton: They don't go to the cities. They are gobbled up right at home.

Professor Burrill: There will be a great demand for those apples, and the city people will send out agents after your fruit from all sides. I don't believe there is any fear of overstocking the market with the best kinds of fruit. We are also learning how to take care of fruit. It should be kept cheaply and be available any day in the year. We are not altogether missionaries in this matter, but I can not help but think it is good missionary work to raise orchards and good fruit.

Thereupon the Society adjourned at 12 o'clock noon.

PRUNING AND THINNING A BEARING ORCHARD.

W. B. FLICK, LAWRENCE, IND.

Although having had the care of an orchard from its infancy to nearly a third of a century's growth. I feel that I can give no specific directions for pruning a bearing orchard except to cut out the dead wood and cut off water sprouts. The variations of climate, of growth, of the purpose in view, and other circumstances and conditions, render the treatment required so varied that the best results can only be secured by personal attention. Principles there are, truly, but it requires natural adaptability, close observation and an extended experience to apply them correctly. The prevalent idea that any one who can use a saw or an ax is competent to trim trees, is erroneous and disastrous—causing, every year, the loss of many fine trees and orchards.

The novice or pretender should never be permitted to enter upon this important work without a competent guide or overseer. Yet we see so-called professional trimmers going about our beautiful cities and through our orchards mercilessly hacking and mangling these noble objects of many years' care, themselves and their employers, apparently, valuing their services only by the amount of mangling done and the magnitude of the brush carted away. Trees which have been objects of praise and admiration for years are by these butchers rendered unsightly remains of a vigorous and beautiful treehood. I believe that more trees and orchards are destroyed by this misguided cutting than by all other causes combined. Owners of trees and orchards, or those who have their care, should be very cautious when employing any one to do this work, and should be fully satisfied that the applicant understands his business. Otherwise the results of years of work and attention will be lost through misdirected effort.

The competent trimmer will not enter upon his work with hand eager to cut and slash, but with due gravity and reluctance. He will feel that he is not working on dead material, that can be easily replaced when

destroyed, but upon living material which when once destroyed can never be restored. The mother tenderly and reluctantly clips the golden tresses from her favorite child. So would I trim these objects of beauty and utility that have been reared under my watchful care.

But some say that is not practical; it is sentiment. We are after practical results, and need practical directions. Now, I would not undervalue the practical side of horticulture, but is there not already too much stress laid on the utility side, not only of horticulture, but of most other avenues of human endeavor? The paramount issue seems to be "money getting." The supreme question is, "Does it pay financially?" The present age seems to be one of trade and profit only, and is not making true men and women, but a race of money getters. All the nobler and finer qualities of true manhood seem to be lost sight of. We need to demand a halt. He who follows any avocation only for the money that is in it works in a low plane, to say the least, and will not wholly succeed. He loses the highest purpose of all human effort which is found on the aesthetic side. He who works conjointly with nature and enjoys her modes in all their variations—who reads divine law of the true, the beautiful and the good, written upon her work, is himself imbued with all the finer sense of nature and nature's God, thereby fulfilling nature's destiny. But we will now endeavor to stick to the practical side of our subject for the sake, if not the benefit, of our practical friend.

We trim to obtain healthy trees, for fruit and for beauty.

If the nurseryman and orchardist have given proper attention to the securing of these points previous to the time of bearing, but very little cutting or removal of wood will be necessary. The nurseryman should see that no unnecessary growths are remaining on the tree when sold—that the top is symmetrical, well balanced and not crowded. When setting out the tree, the branches should be shortened in to correspond with the loss of the roots in digging. Trees which have an upright growth should be cut so that the terminal bud shall be on the outside or farthest from the trunk of the tree—those which have a spreading growth, the opposite.

The after treatment should be confined to removal of dead wood and the rubbing off of unnecessary or undesired growths. More than this is for the most part injurious. The prevailing habit of cutting off all the side branches from the trunk for four or five feet from the ground is a butchering process, and contrary to the laws of nature and common sense. This exposes the trunk and larger branches to the seething sums of summer and the piercing winds of winter, thereby causing sun scald, bark burst, and many other injuries. Observe how nature works in building a tree—she always sends outside branches from near the ground up, and if it stands alone, or by itself, the side branches are all retained, to protect its trunk and large branches from the elements. If it stands in a grove, among its fellows, it has no need of side branches, and they are dropped. This illustration suits my idea of trimming. I believe in low-down wag-

ons and low-down trees for nearly the same purpose. The low-down tree is a money-maker, as well as a money-saver and a tree-saver. It is much easier to spray. The fruit is easily gathered. If the fruit falls from the branches, they are not much bruised. The winds do not cause so many windfalls. The ground is more shaded, thereby retaining moisture. More sunlight and air reach the fruit and leaves.

My orchard trees, mostly set twenty-seven years ago, are so low that one has to get down on hands and knees to pick up windfalls. They, except the tall-growing trees, such as the White Pippin, are scarcely 20 feet high for the highest, with a spread of from 25 to 50 feet. I have been successful in growing annual crops of fine fruit and attribute my success largely to low-down trees.

Thinning out the fruit on the trees is in its experimental state with me, as I have done very little of it. On two occasions I have found the work profitable on apples and pears. The most effectual thinner that works in my orchard is the summer windstorm, but that of the present year came too late to prove beneficial. I believe that thinning is profitable and intend to employ it some when conditions are favorable.

Mr. Johnson: Mr. Flick has spoken of the young tree and the starting and head of the tree, and I notice he uses a low tree. In my practice in starting a young orchard I have endeavored to leave a leader and probably start one or two whirls of branches. I would like to know whether I should cut the top of that leader out.

The President: How far is it to the next whirl of branches?

Mr. Johnson: Twelve to eighteen inches apart.

Mr. Henby: I should think if the leading branch of the tree is in proportion to the other branches, and the other branches are properly proportioned on the tree, it would hardly be necessary to cut the top. Otherwise I should certainly clip the leader proportionate to the balance of the tree. As Mr. Flick intimated, and as was intimated yesterday with regard to trimming shade trees or street trees, I think there have been thousands and thousands of trees ruined by too much trimming, and I think that proper judgment should be used in trimming an orchard. I think the saw and the ax should be dispensed with almost invariably. There are occasions in trimming an old orchard where it probably will be necessary to cut out old branches that have become diseased or decayed. Otherwise, if the saw and the axe are never used in the orchard it would be better. The tree should be equally balanced. That can be done with a hand pruner, and that is about the only tool that should be used on the orchard after it is once established. Now in our little city I have been very much chagrined at our people in trimming their street trees, and I have talked

to them and reasoned with them and lectured them and advised them as to the proper manner of trimming their trees and the proper time, but it does not seem to do any good. I suppose that all horticulturists interested in trimming trees have had the same experience with the average farmer or the average school board or the average town board. However, it does very little good to advise, and I have almost got discouraged. They trim their trees in August or September or June or July, just whenever it comes to their minds to trim their trees, they trim them. They lop off large branches with the saw or the axe, and at that time of the year the sap is in full flow and the tree growing, and it is almost an impossibility to cut a large branch from the tree without loosening the bark, and that of course brings about decay. Now in trimming a young orchard I would trim it very early in the spring or late in the winter, and I would use a very small, sharp instrument, and I would take off such branches as show signs of decay or that have a tendency to unbalance the trees, and if that is done and kept up there will be no occasion for the use of the axe or saw in pruning.

The President: Mr. Van Deman, what form of top is best adapted for the Central West?

Professor Van Deman: My preference is to have a central stem if possible. I would have, according to my ideal, the branches coming out alternately on all sides, not all in one place or all in two places, but in just as many as I could get going round and round the tree. With most varieties two and a half feet is a very good place to begin the heading. Of course the place for heading the tree depends, as has already been said, on the variety. Those varieties that are upright in growth should be headed lower than those that have a spreading, sprawling habit. But in this part of the United States I should say that the central heading is best. Of course I would not have it so dense that the sun couldn't shine through, or so dense that the light couldn't get in to color the fruit, because if you have it very dense the inside fruit will not be colored. I am very much opposed to this idea of trimming off all the little sprays on the main branch. I believe in leaving them the same as nature has them. That will produce the best tree and the best fruit, and there will be less danger of sun scald.

Mr. Flick: I will say in answer to Mr. Johnson's question that it depends somewhat on the nature and growth of the tree. I would not cut out the top or make a cup-shape top with some varieties, especially with the Willow Twig. It branches rapidly and is easily split open or destroyed. I think the central stem system, with that and other varieties which might be named, would be preferable to any other system.

Mr. Little: It seems to me that some varieties of apple trees have a growth more upright, while others are more spreading, and I think the

head should be started about where it ought to be. I believe a low head will always bear earlier and bear more fruit than the higher head, and will remain healthier. After you have the head, and have it thinned out as it should be, then I think the tree should take its natural course. I think that is about as common sense doctrine as can be preached.

Mr. Thomas: Where a tree is allowed to form its head all in one place without a leader it is liable to form forks which are liable to split when the tree is full of fruit. For that reason I prefer the leader to be up far enough so there will be branches enough for the tree. Then if the leader is inclined to not be strong enough or likely to run up too much, I would clip the leader and make the tree of a more open head.

Professor Van Deman: A great many people have old orchards with the limbs of the trees interlocking, or at least coming so close together that you can't get through them in order to spray and all that sort of thing. Now, instead of going into those trees with the axe and saw to trim off the larger limbs and give the few remaining ones on the tree more room, take the axe and deliberately cut down half of the orchard, and then take care of the other half. In many cases it is best to go through both ways and leave only one-fourth, and put the same labor on the one-fourth that you do on all of them, and give them room to develop side-wise, and have less of this little green-colored and worthless fruit. Give the trees room to assume natural positions, and that is far preferable to undertaking to trim them. When in New York two or three years ago. I saw one orchard which I am certain was twenty feet to the first limb.

Mr. Little: Did they have a lightning-rod on it?

Mr. Henby: They didn't need any. They were high enough to catch the clouds almost without any lightning-rod. They were in the forestry business and not in the fruit business.

Mr. Davis: Speaking of these trees being headed low, I would like to ask if the fruit in the center of these trees on these lower limbs would not be of a poor color. I have noticed that in some orchards not very far from us where trees were allowed to head low, and as Mr. Flick said, if you want an apple you would have to play hog and go on your hands and knees after it. Every apple on the lower limbs is not fit to eat or cook. What is the cause?

Mr. Flick: If the tree is properly trimmed so that the sunlight can come in, there will be no trouble. I have picked some of the most beautifully colored fruit that I have near the ground. In fact, I see no difference whatever in the color of the fruit near the ground, unless there is too much shade or the foliage too dense and thus prevents the circulation of the sunlight and air.

Mr. Little: If you will travel over the western country and observe, you will come to the conclusion that the people generally are in favor of a low heavy tree. Most of our commercial orchards are low-headed, and I prefer them because they are more profitable.

Professor Green: The coloring of fruit is due to more than one cause. There is a fruit-grower in southern Ohio who always picks his Rome Beauties twice. He first picks the best colored ones and then he gives the other ones a chance to color. That shows that if you relieve the tree somewhat of the fruit the other fruit will develop. I doubt if the height or the top has much to do with it. I think the condition of the tree and the foliage has more to do with it.

Professor Burrill: I don't like to have the subject entirely passed without a word in reference to pruning. The most vital thing for us to learn is that orchards must be cultivated if they are going to succeed. The best implements for cultivating orchards are those described this morning, the extension spading harrow or cutaway disc harrow, or something of that kind is the thing to use. Whatever you use, you should go under the trees. Trees planted forty feet apart, in ten years the roots will be widely overlapped, and I am of the opinion that the entire surface of the orchard must be cultivated, and not cultivate simply as far as the top extends. I think the orchard is in better shape if it is low-headed, but sufficiently high to permit cultivation.

HARVESTING AND MARKETING.

J. C. GROSSMAN, WOLCOTTVILLE.

We are all ready to acknowledge the fact, especially after hearing the instructive papers of Professor Green and Messrs. Burton and Flick, that it takes careful, intelligent treatment to grow a crop of fruit. And I believe you will all be ready to say that it takes the same careful, intelligent work to properly harvest a crop after it is grown, and much more intelligent business tact to market the crop, at a profit, than it does to grow it.

The first requisite, then, is for the orchardist to supply himself with a sufficient number of strong, light ladders of several lengths, and strong well made step ladders of different sizes. These should all be of such construction as to be easily handled and not cause injury to the trees. I noticed a step ladder in use in Mr. Morrill's peach orchard last August that struck me as having the qualities of strength, lightness, safety, and general utility combined in a greater degree than in any other that I had ever before seen or heard of.

In picking I prefer the common grain sack hung over the shoulder.

This gives the picker the free use of both hands, and also the fruit can be emptied with less liability to bruise than from baskets.

The fruit can be emptied in boxes, barrels, wagon bed or in piles in the orchard as best suits the facilities and convenience of the owner. It should be graded at once and the first and second grade packed and preferably put immediately into cold storage. The third and fourth grades and culls, if there be that many grades, should also immediately be disposed of respectively to the evaporator, cider mill and hog lot. The method of packing and style of package will depend largely upon the variety of apples and the market in which the grower expects to sell.

I believe that we are on the eve of a great revolution in the method of packing and marketing apples.

The orange growers of California were taught a severe lesson in packing by the Australians at the Chicago World's Fair, and they were not slow in profiting by it, either.

So, too, are the California fruit growers teaching us in the middle west and the east a lesson in grading and packing, which it seems to me we are rather slow in learning.

And the large commercial apple growers and exporters of the United States would do well to take the lesson that the Tasmanian apple shippers are giving them and profit by it, as they easily can, by their much better fruit, if properly graded and packed, and their much nearer markets. I am a firm believer in the wrapping and the packing of the apple in small packages. In fact, and I wish to strongly emphasize this point, if the apple grower of to-day and the future wishes to successively and profitably cater to the demands of the best customers and markets, he must wrap his apples and firmly pack them in bushel boxes or in one-sixth bushel peach baskets, as his trade or market demands.

Now if I could be so successful an apple grower, that after grading out the strictly fancy fruit for exhibition at the Pan-American Exposition and have such fruit as Joe Burton's cull Winesaps and Grimes' Golden as he calls them, left, I should take those culls and neatly wrap and pack them in bright new one-sixth bushel peach baskets and cater to the fancy retail market of the nearest large city, and I am satisfied it could be done at a profit, too.

Now, in explanation, and so you do not misunderstand me. I should wrap and pack in the small baskets only choice high quality apples, such as Grimes, Jonathan, Winesap, Snow, etc., but never a Ben Davis in a handle basket. But I believe there would be profit in wrapping strictly fancy Ben Davis, even, and packing in the bushel box for the export trade.

Many who are here to-day will remember the visit to the cold storage plant here a few years ago. We saw there Yellow Bellflowers from Oregon, packed in boxes, and I was impressed by that sight that that would be the package for the future. I believe that impression will be verified in a few years.

DISCUSSION.

Mr. Burton: Uniformity is important. Mr. Grossman says he favors gathering the apples in a sack. I do not believe in that. After they have stood a few days there will be found bruised places which would not even make good cider, and after he has gathered them in this way then he insists on wrapping them in tissue and parchment paper. He must have got that from a very old magazine. My idea is that we must gather the apples carefully, as well as wrap them carefully. I believe they should be gathered in a basket, and not a very large basket, either. They should be placed carefully in the basket. You should avoid picking apples in sacks. It makes me nervous when people come to my house and want to buy apples, and put them in a sack. One of my relatives came once and bought seven or eight bushels of cull apples, and put them in sacks. He asked what I would charge for the apples, and I said to him, "If you will never come with a sack any more I will give you these." Monday morning a man came to my house and wanted some cull apples, and he took them six or seven miles in two sacks. I just wondered what kind of fix they would be in when he got home.

Professor Van Deman: I will say in defense of the sack business, that Judge Wellhouse has for many years been using sacks, and he has picked hundreds of thousands of bushels of apples.

Mr. Thomas: With reference to boxing apples, I am of the opinion that apples should be put on the market in small baskets, so that a man can take a basket on his arm and take it home with him.

Professor Van Deman: Within the last year we have had considerable said in the papers about using boxes for apples. A good many have been trying it. I think that the boxes cost one-half more than barrels.

The President: The box is the proper package for export.

Professor Green: I have used the box, and the first difficulty is in the packing. I can't make it come out right, and you can not pack apples in a box as fast as you can in barrels, but I am quite sure they will sell better, and I think you can get enough more for them to pay for the extra price of packing.

Mr. Grossman: Can you describe the boxes in dimensions.

Professor Green: I can't give you the exact dimensions, but they should hold about a bushel. Some say they should hold one-quarter of a barrel and others about a bushel.

Mr. Simpson: Mr. Aldrich of Illinois sold his apples this year to the Born Bros. of Chicago, and packed them in boxes eleven inches square and twenty-two inches long.

Professor Van Deman: That is the inside measurement?

Mr. Simpson: It was a solid box, and the side, or rather the top spread out.

Mr. Henry: Last summer I had a few very fine yellow apples. So I thought I would experiment and see what I could get out of them. So I took some little three-pound baskets which would hold nine apple apiece, and picked them in those baskets, and took them down town and sold them at fifteen cents a basket. It would take about twenty-five of those baskets to make a bushel. They were selling apples then out of the store at sixty cents a bushel, and I thought I got paid pretty well for my fruit baskets.

The following report of the Committee on Awards was adopted:

Members of Indiana Horticultural Society:

Your awarding committee begs leave to report the awards on fruits and flowers made by them, to wit:

C. P. Bradley was awarded premium on apples as follows: First on Hubbardson, R. I. Greening, Baldwin and Pewaukee; second on Rome Beauty and Wagner.

H. H. Swain, second on pears.

S. Johnson, second on R. I. Greening and first on King.

Noble County Horticultural Society, first on Wagener and second on Maun.

Lagrange County Horticultural Society, second on Talman's Sweet and McAree.

R. H. Newman, second on Smith Cider.

Mrs. W. B. Flick, first on carnations and cut flowers. (Amateur.)

Albertson & Hobbs, first on persimmons.

Southern Indiana on Smith Cider, Wine Sap and Grimes' Golden.

Joe A. Burton, first on Wine Sap, Ben Davis, Grimes' Golden, Genet and Kentucky Red Cider Crab.

S. T. S. Williams, first on N. W. Greening, York Imperial, and second on York Imperial.

W. B. Flick, second on persimmons, Rambo and Willow Twig, and first on Jonathan, Willow Twig and White Pippin.

Mrs. W. B. Flick, second on Genet and quinces.

Snead Thomas, first on Vicar and Duchess pears, Mann apple and quinces.

W. B. Flick, first on display of pears.

J. J. Milhouse, first on late pears.

J. Y. Demaree, first on Red Detroit, Porter, Twenty-ounce and Bailly Sweet and second on Baldwin, Wealthy, Gravenstein and Falawater.

B. F. Cole, first on Bellflower, Romanite, Missouri Pippin, Maiden Blush, Rambo, Benoni, Gravenstein, Red Canada, Smith Cider, Falawater, Gilliflower and Rome Beauty, and second on Northern Spy and Rambo; first on pawpaw.

W. D. Thomas, first on Northern Spy, Roxbury Russet, and apples adapted to central Indiana first and second on Ben Davis, Yellow Bellflower, Hubbardson, Grimes' Golden, Jonathan, Pewaukee, Winesap and Maiden Blush.

J. R. Clore, first on Stark apple.

Fred. Dorner, first and second on carnations. (Professional.)

Your committee desires to report further that we found many exhibits misnamed, some named and not entered and some others not named at all.

L. B. CUSTER,

S. JOHNSON,

W. C. REED,

Committee.

REPORT OF VICE-PRESIDENT OF SOUTHERN DISTRICT.

MRS. W. W. STEVENS.

This has been an unprofitable year for most tree fruit growers in the southern part of the State—in fact, we have not had a profitable crop of apples or peaches for three years. Some farmers along the Ohio River, where large orchards were planted a few years ago, and which were formerly very profitable, are becoming discouraged, and we hear of some that are cutting down their trees. The only real nice fruit of either apples, peaches or pears in Washington County the past season were found on the low lands, or in the ravines in orchards. We found but one profitable orchard in our neighborhood the past season, and that was on low, flat land, protected on the west and north by forest trees. The fruit industry on the average farm is decidedly on the decline. The business is fast going into the hands of the specialist. Old orchards are dying out and but few new ones are being set out to take their places. And it is well that the old plan of the farm orchard is being given up, for it don't pay. The average farmer should have a few trees, one or two of the leading and best varieties running from the earliest of the season to the latest. These he can find time to spray and properly care for, and they will be profitable for home use, and we might add, indispensable as well. With a small spraying outfit, any farmer can find time to go over a dozen or so trees just when they need it, so as to have an abundance of perfect fruit. How

or why it was that the cherry crop was such a good one with us the past year we are not able to tell. It was the most abundant it had been for a number of years.

Small fruits were an average crop, and growers realized fair profits. The Snider blackberry is fast becoming a thing of the past. On account of its course seeds housewives will hardly have them as a gift, especially when they know of the newer and better kinds.

One of the fruit crops that is now attracting more attention than formerly is the persimmon, both the wild and cultivated. They are harvested from the first of August to January. In our own local market we seldom see an over-supply. Now that they can be canned and kept for use all through the winter, they are being sought after much more than formerly.

We observed that a great many of the small spraying outfits were sold in our county the past season, they being bought in most instances to experiment with, but as apples failed it could not be told how much good the spraying did.

The fruit trees went into winter quarters in most excellent shape, on account of there being no fruit the past season and late fall. We don't know that we ever saw the buds in better shape at this season of the year.

Twig blight did great damage to many apple trees the past season. It seems that this trouble is growing worse year by year.

The Keiffer pear is steadily gaining in favor in my district. For a few years now they have been our most profitable fruit, and are in good demand, both to eat out of hand and as a canner. Whether it is due to our soil, or that they are being better handled than formerly, we do not know, but the fact remains that wherever you once sell a bushel of well ripened Keiffers there is no trouble in holding a customer. The failure of other fruits has possibly made a demand for the Keiffer, but it is fully capable of holding its own.

DISCUSSION.

Mr. Swain: I want to add a word with regard to the Keiffer pear. I have had the same experience as Mrs. Stevens.

Mr. Little: I will say that a few years ago, as some of you will remember, I stood out against the State of Indiana and the world and advocated the Keiffer pear, and I still favor it. I got some grafts from Mr. Furness and top grafted a seedling tree, and the next year it was loaded down with pears. I loaded them in the cellar like potatoes, and they lay in the cellar until they got yellow. I did not expect they would ever be any account. They seemed to be tasteless. I was prejudiced against them. Along toward Christmas I took hold of one and it seemed to be soft, and I bit into it. I liked it and took it and introduced it to my folks, and

they all liked it, and I filled my pockets and went down town and gave some of them to my friends, and they would smile, and once in a while I would meet an enemy and give him one, and he was always my friend afterward. So I concluded the Keiffer pear was a good thing after all. I don't know of anybody now who is not in favor of the Keiffer pear. This pear has always been a kind of mystery to me. It depends on treatment altogether as to whether it is one of the best or one of the meanest things in the world. If treated right it is a good thing. And my observation is that the Keiffer pear must be smothered when ripening. My plan is not to gather my Keiffers until just as late as possible. I didn't gather them this year until after the election. Now I can show you as nice Keiffer pears as you ever saw. I sold ten bushels yesterday in Danville. In measuring my ten bushels I found about one pear to the bushel that was specked. The Keiffer pear should be ripened in the dark and it should be smothered. You don't want the light on it. If it is ripened in the dark it will ripen through and through. I can not think of anything that has been introduced in my day that is as good and valuable as the Keiffer pear. I don't believe any pear on earth can stand against it on the market. We don't have any use for apples in our house, although we have good apples in the cellar. We use the Keiffers.

Mr. Johnson of Marion County: I want to say a word with regard to the Keiffer pear. At first I said some very hard things about it before the Society, but I have taken it all back. Now I want to say that I endorse everything that my brother has said. I could not do without them. I would not think of doing without them if I had pears at all. This pear is entirely different from what I first thought it was. When you can pears in the fall or this time of year and when you open them in the summer or next spring you can not tell this pear from the Bartlett.

Mr. Fletcher: I want to say a word with reference to persimmons. At one time I was in the country where nothing but persimmons grew. They did not have to be cultivated. I was anxious to know what could be done with such a fruit if it were cultivated. I planted some seeds, and the result was that I had as large a variety as I had of seeds. I had more interest and pleasure in bringing forth that fruit than anything else. This climate is well adapted to persimmons. There is in this town a tree planted by Bishop Ames fifty years ago. It is eighteen inches in diameter and has fruit on it to-day. It has one or two seeds to the persimmon. Because persimmons will pucker one's mouth there is no reason that it should not be better than most any fruit when ripe. Give the persimmon a chance.

Mr. Kingsbury: In regard to the Keiffer pear I class it for my eating with the Ben Davis apple, and I like it about as well as I like Mr. Johnson's friend, the English sparrow. My family has no desire for the fruit.

We can not get it in condition wherein we like it, but I think enough of it to offer it to those who have no other fruit. I superintend a little Sunday-school in the Guardian's Home at Irvington, and I one day asked the matron if she thought the inmates would like some pears; that I had some pretty nice eating pears, but they are not good enough for my family, and if you say so I will send them out and you can see if the children like them. She said, "Bring them along; they will eat most anything." I took over a bushel, and I never heard of any ill results from eating the pears, and they got away with them. That is about the only disposition I have been able to make of my Keiffer pears.

Professor Van Deman: It may not be known to the public at large that all the canners who are canning Keiffer pears are, with one exception, in the United States, as far as we have found out. With one exception they are all labelling the cans "Bartlett." Whether or not that is a fraud, of course, remains to be proven, but it seems to me that the Keiffer should be labeled in its own name. I think myself it is not equal to the Bartlett in flavor when canned. I think the Bartlett is the better of the two, but still a well canned Keiffer in proper condition is a very good thing, and there is no denying of the fact that the Keiffer pear to-day is the business pear of America, just as the Ben Davis apple is the business apple of America, and I am glad to see that the country is being filled with the Keiffer pear and that our people who carry the dinner pail and work by the day will be able to have Keiffer pears in abundance after a little while. As to the persimmon, let me drop one suggestion: Indiana, especially the southern part of the State, is an excellent place to grow persimmons. There is no doubt but that there is a great future in the raising of persimmons if properly treated, if the same effort is made to improve the varieties of the persimmon as there is the varieties of the apple or any other kind of fruit, and I want to urgently suggest to those who are in position to do so, that they try to cross the native persimmon and the Japanese. The Japanese varieties should be protected with hay or straw and control the temperature. If the native varieties are cross pollenized with the Japanese, that will produce a generation of seedlings which undoubtedly will be of great value to the country. This is worthy of the closest attention of the very best experimenters. One of the best varieties of the Japanese persimmon is the Yedoichi. It comes from the island of Yeddo, which is in the northern part of Japan. It is one of the hardest and very richest in flavor. I am sorry to say it is quite seedy. The flesh is dark colored inside, and the size is about the size of an ordinary Winesap apple. Zengi is another very good quality, and is also one of the hardiest, and it is dark fleshed and seedy. Another very good one is Tanenashi. This is a seedless one and is not quite so hardy as the two I have just mentioned. You should protect them just the same as you would fig trees or you should put them in fruit houses where you

can protect them thoroughly. Cross with the native species and I think you will see in twenty or fifty years from now these crossed varieties all over the country, just as hardy as any of our native varieties, and with fruit two or three times the size and fully as good or even better quality than any we have, though I like the quality of our native persimmon.

Mr. Phelps: The storm which destroyed Galveston blew off sixty-five bushels of pears, and I put them in a crib in a dark place and threw a blanket over them, and in about two or three weeks from that time they became mellow, although they were not much more than half grown.

Mr. Clore: There is one very important point which I have not noticed being touched on, and that is the handling of the pear from the time it is pulled off the tree until it is marketed. I have often heard the remark that you can handle the Keiffer pear like rocks, but I find in my experience that is a great mistake. Any fruit should be handled as carefully as eggs, and it doesn't make any difference how hard the pear is when you take it off of the tree, it takes only a very slight knock or jolt to cause the pear, as it begins to mellow, to have a black speck on it, and that will spoil the sale of the pear. Last fall I hauled Keiffer pears twelve miles to market and sold them readily at one dollar a bushel, while grocerymen had pears going to waste on their hands at sixty cents a bushel. That was simply because their pears had been handled roughly, poured out of baskets into barrels and tubs, any way to get them off their hands, and they were a hard looking sight. When you drive up to a house with nice yellow pears I tell you they will buy them.

Mr. Little: I would like to ask a question with reference to the fungus or russet appearance of the Keiffer pear. Has spraying been effective in this respect?

Mr. Simpson: It has.

Mr. Little: I don't know of any Keiffer pears in Hendricks County for sale now excepting what I now have. I suppose I have thirty bushels of them. I have gathered between fifty and one hundred bushels since the election. The longer you leave these pears on the tree the longer they will keep, provided, of course, they are not frozen. A little freeze won't hurt them. Put the pears in the barn and bed them down with straw and put blankets over them. I let them get cold. Just so they don't freeze, the cold will not hurt them. I let them get just as cold as they can get without freezing, and I cover them with clover hay. I think the clover is a nonconductor. This is a cold storage of my own.

REPORT OF VICE-PRESIDENT NORTHERN DISTRICT.

J. C. GROSSMAN, WOLCOTTVILLE. IND.

To the Officers and Members of the Indiana Horticultural Society:

I respectfully submit the following report for your consideration:

Upon assuming the duties of the vice-presidency of the Northern District, we felt that one of our first duties to perform was to increase the membership list, if possible; as that, at the present time, is the only source of revenue of the Society.

This we succeeded in doing in Lagrange and Noble counties, where we could look after the work personally, while in other portions of the district, which we could reach only by correspondence, there was both loss and gain.

In order that you may understand fully the location of the membership in this district and where the loss and gain occurred, I give the list by counties for both the years 1899 and 1900, which is as follows:

	1900.	1899.	Gain.	Loss.
Adams .....	..	..	..	..
Allen	3	2	1	..
Debalk	6	3	3	..
Elkhart	1	3	..	2
Fulton	1	3	..	2
Huntington	3	1	2	..
Jasper	2	2	..	..
Kosciusko	1	..	1	..
Lagrange	20	6	14	..
Lake .....	..	2	..	2
Laporte	1	1	..	..
Marshall .....	..	3	..	3
Miami	4	1	3	..
Newton	1	1	..	..
Noble	32	17	15	..
Porter .....	..	..	..	..
Pulaski	2	2	..	..
Starke .....	..	..	..	..
Steuben	4	1	3	..
St. Joseph	13	26	..	13
Wabash	1	2	..	1
Wells .....	..	1	..	1
White .....	..	..	..	..
Whitely .....	..	..	..	..
Total	95	77	42	24

Giving a net gain of 18 over the previous year.

The loss, I think, is the result of simple neglect to send in their annual fee on the part of some who are not in the habit of attending the meetings, and thus do not get personally reminded of the fee being due.

The gain you see is largely where we were enabled to give our personal attention to the work. Now, it is practically impossible for a vice-president to see all the members of his district to remind them that their fees are due, or to solicit new members in each county of his district personally. Now, if by personal work the membership in two counties can be increased 29, why can not each member who attends this meeting go home and do a little personal work among his friends and neighbors? If they would do so the membership could easily be doubled.

St. Joseph, Noble and Lagrange counties each have active and prosperous local societies.

We understand Allen County organized a local society the fore part of the year, but we have been unable to secure any data in regard to it. So far as we can learn these are the only local societies in the district.

The St. Joseph and Noble county societies each made exhibits at the last State Fair, St. Joseph County carrying off the sweepstakes and Noble County the fourth prize for the best county exhibit.

There were also a number of individual exhibitors who carried off a fair share of the premiums in other classes. And there will be more in the future.

The soil of this district is so diversified that all the known fruits that can be grown in this climate are produced in some locality of the district. Yet there are as yet no very large tracts of orchards, but numerous small ones in favored locations.

But there are yet many favored localities, principally bordering on the small lakes, especially adapted to peach and apple culture, that are yet practically undeveloped.

We are happy to say, though, that the plantings of these two standard and indispensable fruits are on the increase, and we predict that ten years hence there will be a wonderful increase in the fruit product of this district.

The noted lake region and fishing grounds of Indiana lie wholly within this district, and there is scarcely a lake, no difference how small or remote from railroad facilities but what has its campers and cottagers during the summer season. There is an ever increasing population to these quiet rustic resorts, from the cities of Chicago, St. Louis, Indianapolis, Richmond, Muncie, Ft. Wayne, Dayton, Cincinnati, Columbus, and smaller cities and towns within and bordering upon this district. Where the summer population a few years ago could be numbered by the hundreds it is now numbered by the thousands.

Some, no doubt, are wondering what this has to do with the horticultural report of a district vice-president. It is this: That instead of having to send the bulk of our summer fruits to the city market, the city cus-

tomers come to our very doors, we might say, and demand the best fruits that can be produced, and gladly pay the top price for a choice article, thus making a satisfactory market for the horticulturist, for all kinds of produce, and what is more and better, a profitable one. Many wide-awake horticulturists of this district, who are so fortunate as to be located near these resorts, have not been slow to take advantage of these opportunities. This will be, in the future, one of the greatest factors in the development of the fruit industry in the Northern District.

In this district also are found a great many of the finest and most extensive marl beds in America. The prospect of the extensive development of these in the near future will be another important factor in the development of the fruit industry.

The season of 1900 was a favorable one in most respects for the fruit grower. While the crops of some fruits were below the average, the crop of the majority was a fair average, and the prices in most cases ruled better than for several years past.

About July we received the following communication from the Secretary of the Oregon State Board of Horticulture:

Portland, Ore., June 28, 1900.

"Mr. J. C. Grossman, Vice-President Fourth District Indiana State Board of Horticulture, Wolcottville, Ind.:

"Dear Sir—We beg to report to you, for the benefit of your horticulturists and dealers, that at this time the fruit crop of Oregon is about as follows, the percentage being based on a full crop, viz.:

	<i>Southern Oregon.</i>	<i>Western Oregon.</i>	<i>Eastern Oregon.</i>
Apples	80	90	100
Pears	20	80	95
Purnes, French	50	100	...
Prunes, Italian	10	30	100
Cherries .....	..	65	90
Grapes .....	..	65	...
Peaches	10	...	95

"We would thank you for information of the condition and present prospects of the fruit crop in your locality.

"The writer takes pleasure in handing you herewith our latest Spray Bulletin.

"Very truly yours,

"HENRY E. DOSCH, Secretary."

And also later we received a like request from James Handly, Quincy, Ill., Secretary of the Mississippi Valley Apple Growers' Association. In order that we might intelligently comply with these requests, and believe-

ing that the same information would be of interest to our own Society, we sent requests for the desired information to horticulturists in each county in the district, and received prompt and complete reports from twenty-one of the twenty-four counties.

We wish at this time and place to thank all those who so kindly and promptly complied with our request. And we also wish to incorporate these replies, as a part of this report, in the published proceedings of this Society.

These reports we tabulated and furnished the Secretary of this Society with a copy of the same at the summer meeting, held at Plainfield, August 16-17, 1900.

In this report we can only refer to the average per cent. for the district, which is as follows: Apples 58 per cent., pears 66 per cent., plums 58 per cent., peaches 34 per cent., cherries 53 per cent., quinces $42\frac{1}{3}$ per cent., grapes $84\frac{1}{2}$ per cent., strawberries $83\frac{1}{3}$ per cent., raspberries $82\frac{1}{4}$ per cent., blackberries $76\frac{1}{2}$ per cent., gooseberries $75\frac{1}{2}$ per cent., currants $81\frac{1}{2}$ per cent., and huckleberries 55 per cent. By the above figures you will see that orchard fruits were below an average crop, while bush and small fruits were above the average.

But what promised to be a fair crop of apples was changed in a day by the "tail end" of that great and terrible "Galveston storm." In many places there was not 10 per cent. of the crop left upon the trees. Thousands of barrels of what otherwise would have been good fruit had to go to the cider mill and the evaporator as a consequence of that storm.

We expected to secure a good exhibit of fruit for the Pan-American Exposition, but the sad havoc that the above storm played with the fruit made it hard and tedious work to find suitable fruit. We, however, received promises from a number of apple growers in the district that they would contribute, but how many barrels have been forwarded we do not know.

We made the attempt to collect a barrel from the farmers of Lagrange County, and after a week's hard work, and consequent neglect of our own business, we succeeded in getting three-fourths of a barrel of fair fruit.

Trusting that the facts and thoughts given herein will meet with your approval, and that they will be of some practical benefit to the Society and of interest to the individual members, we conclude our report trusting and firmly believing that the coming century will see greater progress in the science of horticulture and in the development of both new and native fruits, and that prominent among these will be the persimmon and the "Hoosler banana," the pawpaw.

ANNUAL REPORT OF THE NORTH CENTRAL DISTRICT OF THE
INDIANA HORTICULTURAL SOCIETY.

AMOS GARRETSON, VICE-PRESIDENT, PENDLETON, IND.

I can not say that the past season has been noted for its extremes—cold, hot, wet, or dry—but it seems we have some failures of some crops in one locality and of other crops in another locality. Apples have the lowest average per cent. of any fruit in this district the past year, 29%.

In several counties the per cent. was as low as 10. In our neighborhood there was almost an entire failure. The trees bloomed well, apples set on fairly well, then the trouble set in. What was it? Curcullo, fungi, lack of vitality, or something else. When I drove into my orchard to give it the fourth spraying, I found the trees almost fruitless. It could hardly be for want of spraying, as I sprayed four times, twice before the bud opened with sulphate of copper 6 pounds, lime 6 pounds, water 50 gallons; and twice after the bloom fell with copper 5 pounds, lime 5 pounds, water 50 gallons. We had a fair crop of Malden Blush; they seemed to ripen prematurely and decay quickly.

Willow Twig was the only winter apple, and not more than 25 per cent. of a crop. They were very knotty, with plenty of bitter rot. If any one can explain the cause of such a failure, I am sure the most of us would be glad to know it.

There is an old saying, that "man never gets too old to learn." I will give a little of my experience with strawberries. In the fall of 1899, we had the finest looking strawberry field I ever saw, planted in hills 32 inches each way; not a runner or weed allowed to set; each plant would average 18 to 20 inches across. During the winter we hauled from the stable (which had been heavily bedded with straw) and threw in between and close up to the hills a heavy mulch. There was no mulch over the center or crown of the plant. I was expecting to break all strawberry records. Well, I think I did, for when spring came the plants were like our wheat—gone. Upon examination I found that the crown had been torn from the roots by the freezing and thawing. Consequently I had a very fine melon patch.

Now you may imagine how I felt when I stepped into a neighbor's berry patch in fruiting time to find it simply loaded. He had allowed all runners, as well as weeds and grass, to grow. How shall I prepare for the next crop? I think I know the trouble in my case, after it is too late. The ground had been thoroughly cultivated from early spring until late fall; and not allowing any runners to set, the roots ran down very deep into the soil. I think if I had mulched heavily early, over the hill, this trouble would not have happened.

In the case of my neighbor's patch, the roots from so many runners, the grass and weeds, with the little mulch he gave them, seemed to protect them. I shall try the hill culture again, when I have the assurance of plenty of mulch. I am fully convinced that the hill culture needs heavy mulching early, especially heavy over the hills, which should be taken off from the crown of the plant in the spring.

I do not think the dry weather affects the hill near so much as the matted row. In the latter case the roots run close to the surface, while in hill culture they run very deep.

I have reports of the per cent. of fruit and berry crops from twenty-one counties out of twenty-six in the North Central District. The highest per cent. of fruit is shown by the following table:

	<i>Per Cent.</i>
Apples—Jay County	75
Pears—Henry County	100
Peaches—Montgomery County	70
Cherries—Boone, Tipton and Randolph	100
Strawberries—Benton, Boone, Delaware, Hancock, Henry and Tippecanoe	100
Raspberries (red)—Hamilton and Tippecanoe.....	100
Raspberries (black)—Boone, Hamilton and Tippecanoe.....	100
Blackberries—Boone, Clinton, Grant, Hamilton and Han- cock	100
Currants—Benton, Grant and Tipton	100
Grapes—Boone, Grant, Hamilton, Henry, Jay, Randolph and Tipton	100

Mr. Davis: I wish to say a word about the "Hoosier banana," the paw-paw. This is a fruit that every one knows, and it seems like there are a few people who know there are as many varieties as trees. Some are a great deal better than others. Two years ago I shipped fifty bushels to Indianapolis, some of them put up in peck baskets and some in half bushel baskets. I would pick them when they would commence ripening. I think I could sell five hundred bushels in the city. I think they are worthy of some notice at least. I sold them at a dollar and twenty cents a bushel net.

Mr. Henby: Did you grow the trees yourself?

Mr. Davis: They grew wild near the house where we could watch the boys out of them. We did not have to pull them green.

Mr. Henby: Isn't it very difficult to grow?

Mr. Davis: It is very easy to grow from the seed.

Mr. Johnson: Isn't it a fact that it does not take to culture like other fruit and that it has to be out in the woods in a shady place with weeds around it? It is undoubtedly the finest fruit in the world if we simply could propagate it.

Mr. Johnson of Marion County: Judge Hadley told me that he had planted out an orchard in pawpaws four or five years ago, and I want to inquire of some of these Hendricks County people whether you know anything about the result of that orchard of pawpaws.

Mr. Davis: A great many of the trees grew all right, but some were mashed down by the stock, and I think probably a few of them bore this last season. It is no trouble whatever to get them started from the seed, but it is difficult to get them to grow by taking them up. You can plow over a field for ten years, and the pawpaws will come up and you can't kill them. But if you take them up and try to reset them, it is difficult to get them to grow. That was in the garden like a pear or apple tree, and no mulch was around it at all.

Dr. Preston: I am very fond of pawpaws. I am interested somewhat in the growing of them from the seed. You can overcome the difficulty in transplanting them, I think, if you take them when quite small. I have a number of them growing in my yard. Only recently I attempted to grow some of them and they are making a very nice growth. They are very slow growers, and I had them in a rather shady place.

The President: When would you transplant them?

Dr. Preston: When they are one year old.

Mr. Phelps: I have planted hundreds of seeds and I never sprouted but one. They run from the main root like sassafras. You find them in dense forests. I have transplanted any quantity of them. I never found but one that came from the seed.

Dr. Preston: I know a man who grew them from the seed, because there were no other trees around. You can hardly tell what the roots are except when you break one and smell it, and then you find the odor of pawpaw.

Professor Van Deman: I grew up among the pawpaw bushes of southern Ohio. I have been acquainted with it ever since childhood. Never but once have I tried to grow the pawpaw in cultivation, and that was in our own garden. We had one tree which came up near an old walnut stump and that protected it from being destroyed by the cultivation of the orchard for a number of years, and it looked so well and behaved so well we concluded to take care of it. It was out in the open just as we have orchard trees, and seemed to flourish, and finally bore fruit

abundantly, and that was the only case in which I have ever seen it under cultivation, except in one case in Washington City. I know one tree there in the garden which seems to do well. I have been very much interested in the statements made here about trying to cultivate this fruit as an orchard fruit. I believe there is a future for it like the persimmon. I think Indiana is especially well adapted for the purpose of raising this fruit.

Mr. Kingsbury: At what age does the tree begin to bear?

Professor Van Deman: As I recollect, the tree must have been eight years old.

Mr. Tilson: I know all about pawpaws if anybody does, because I have had so much experience with them ever since I was a boy. These pawpaws shown here at the State Fair from year to year come off a tree that grows in my field. That tree will have from one to two bushels on it. It is a very large one. It is almost two feet through. To undertake to raise pawpaws you must put the seed in a little pot, put that in your warming bed in the spring, and when the seed sprouts and there are one or two leaves, take it up carefully and set it out and it will grow without any trouble. Leave them out all winter. If you try to grow them in the sun I think you will make a failure. That is, right in the sun. It is best to plant them in the shade of a forest or orchard. I left a large pawpaw tree in a field when I cleared the field in 1866, the year after I came out of the army. That pawpaw has been there ever since. It is shady on that side of the woods. It has never failed during that thirty years. There are three distinct kinds of pawpaws that I know of. One you don't have to wait for the frost to ripen it. It ripens about the time the Rambo apple does. There is another that ripens a little later, and there is another that is hanging on the bushes yet, and you have to wait until Christmas or January before it can be eaten. I wouldn't try to raise pawpaws in the sun.

Dr. Preston: I believe it is a tree that needs a certain amount of shade. I remember distinctly of gathering pawpaws in pastures where the timber had been cleared out and where the pawpaws grew in clumps and where they shaded themselves, out of way from any timber, and they were very nice fruit. I believe in planting the trees close enough together so the trees will shade themselves as well as by the side of a forest. That is an idea I have. I don't know how true it is; I never tried it.

Mr. Teas: There is a pawpaw tree I have known about thirty-five years that is just as much isolated as any tree can be, and it is flourishing. This tree is in Richmond.

The President: I have frequently been at the home of our friend, Mr. Little, the persimmon man, and he is about as enthusiastic on pawpaws as persimmons, and he grows them whenever and wherever he wants to from the seed. He has them growing along the fence, or in the orchard between the orchard trees, and he says the ideal place to grow pawpaws from seed is around the edges of a bush pile so that they can have moisture until they get started.

Professor Van Deman: Some one suggested that it was best to plant the seed and put a barrel without a head over it and leave it there until the tree grew up.

The President: Mr. Little practices that method.

Mr. Johnson: I think Judge Hadley said that was the way he was going to start his orchard.

Mr. Grossman: What amount of fruit, Mr. Davis, does your tree bear?

Mr. Davis: There is a great difference. Some trees bear a half dozen pawpaws, and others a bushel. It depends on the size of the tree, somewhat. These trees we have in the garden now—I think it is four years only—are from the seed, and this last season there must have been a basketful picked. Talk about shading themselves, one of those trees not any taller than my head had more foliage on than some trees have in the woods thirty feet high. The limbs come out symmetrically and there are large, glossy, dark green leaves which you would hardly recognize being a pawpaw. They look more like a young magnolia tree. They adapt themselves to the places where they are, and I think the fruit is better.

Mr. Burton: Let me introduce a new kind of fruit, and one that is not bragged on very much, and that is the black haw. I have found haws growing three times as large as I ever saw before near our former home, and I have procured seeds and expect to plant them.

Mr. Henby: Just one word for the benefit of my friend, Mr. Kingsbury, and perhaps others who are yet prejudiced against the Keiffer pear. If Friend Kingsbury would come to my place, as he used to when he was in politics, I think I could give him lessons on the Keiffer pear which would probably have something to do with removing his prejudices, and that is, how to serve it after it is ripe. It has already been suggested how to ripen it and care for it, etc. We take the cores out and slice them and lay them in a dish and spread nice granulated sugar over them, and it makes a dish good enough to set before a king.

VICE-PRESIDENT'S REPORT FROM SECOND DISTRICT.

GEO. P. CAMPBELL, BLOOMINGTON, IND.

It has been rather discouraging for fruit growers the past season in the Second District.

I have only been in two counties in the district besides my own. Those were Greene and Brown. From my observation in these counties there was not a fourth crop of any fruit except cherries, and possibly strawberries. I have made inquiries as to other parts of the district and have received about the same report.

There was considerable complaint of apples ripening prematurely and dropping off and decaying. Some attributed this to the very warm autumn weather, but the curculio had a good deal to do with it, as they seemed to be worse this year than ever before.

It seems that spraying had very little effect this year. There is an orchard near Bloomington that was sprayed four times and the apples dropped and decayed very badly. Since picking they have nearly all rotted and there is scarcely a perfect apple to be found.

A great many are getting discouraged and say it is no use to try to raise fruit in this country; that it costs more to fight insects than the fruit is worth after they get it.

What can be done to revive new hope in the farmers and fruit growers of the State? Old Indiana has been considered one of the best fruit growing States in the Union, but I fear if something is not done to stop the ravages of insects that we will have to take to the background.

Already there are carloads of apples being shipped to Indiana from other States that are retailing at \$1.50 to \$2.00 per bushel.

Shall we continue to let this vast amount of money go to other States for the fruit that we consume, or shall we make a more determined fight against insects and disease and grow our own fruits?

At the evening session the matter of making the exhibit at the Pan-American Exposition at Buffalo, in 1901, was left to the Executive Committee with power to act.

REPORT OF COMMITTEE ON REVISION OF RULES FOR STATE FAIR EXHIBITS.

JOE A. BURTON, CHAIRMAN.

We recommend the following changes:

1. Of crab apples a plate shall consist of ten specimens.
2. That the last sentence in Rule II (Normal size and color of a variety to form the standard of perfection in all cases) be stricken out.
3. No award shall be allowed on polished fruit.
4. Russet skin shall not be considered a blemish.
5. That red cider crab be added to the list.
6. That the State be districted by the President into the Southern, Central and Northern, and premiums offered for fruit separately for each district.

On motion, the report of the committee as above given was accepted.
Next was an address on—

THE PHILOSOPHY OF SPRAYING.

PROF. L. R. TAFT, AGRICULTURAL COLLEGE, MICHIGAN.

The act of spraying, as now commonly understood, is the application to trees and other plants of materials known as insecticides, for the destruction of injurious insects, and of fungicides to prevent the attack of parasitic fungi. The remedies are in a liquid form and are applied with a force pump or garden syringe. In order that one may make a rational use of these materials, it is of the utmost importance that the nature of the various pests be understood and that the way in which the different remedies take effect be known.

While nearly all insects and many of the fungi are only found on the exterior of plants, there are some species that pass the greater part of their existence inside their hosts, and can only be reached with spraying compounds, if at all, while on the outside. It is also commonly known that all insects and many fungi pass through several stages of development, and that at some periods they are much more vulnerable than at others. A third and much more important reason why it is necessary to understand the nature and life history of the destructive insects and fungi before attempting to destroy them is that remedies which are found

perfectly effective against one form may, on account either of some difference in structure or method of feeding, prove of no value against others. This is especially true with insects, and many of the failures reported in destroying them have been due to the use of materials utterly unsuited to the purpose. The greater portion of our more injurious insects obtain their food by biting off portions of the leaves, fruits or other exterior parts of the plants to which they are injurious, and it has been found that the surest and best method of destroying them is by spraying the plants with some material containing arsenic, just before the damage is likely to occur. Many of the other destructive insects suck the sap from plants and as it is taken in through a long tube, which they insert into the tissues, it is not possible to reach them with a poison, but remedies that kill by contact, or act through the respiratory organs, must be used. In the latter group we find the plant lice and scale insects, while in the former are the larvae of moths and butterflies, and the larval and perfect forms of beetles and other chewing insects.

Until recently the arsenic most commonly used was paris-green. This was applied in water at the rate of one pound in 150 to 200 gallons, or somewhat stronger for the potato beetle and canker-worm. A small part of the arsenic found in paris-green is soluble in water, and at first some trouble was experienced from its use upon tender foliage, but it was found that the addition of a pound of lime for each barrel of water would neutralize the arsenic and prevent injury. The use of Bordeaux mixture and other materials containing lime, in connection with the paris-green, will give the same result. Paris-green, when used alone, has but slight adhesive power and hence is readily washed off the plants, but its staying qualities are greatly increased when lime is used with it, and on this account also the addition of lime is desirable. The principal trouble experienced in applying paris-green is from its tendency to settle to the bottom of the barrel or tank used to hold the spraying mixture. A good mechanical agitator should be used, especially if a barrel is employed, while the tendency to settle will be greatly reduced if the paris-green is mingled with properly prepared Bordeaux mixture.

Arsenite of lime has for several years been used as a substitute for paris-green. The principal claim made for it being its cheapness, while it is fully as effectual, if not more so, than any of the other arsenical preparations. As white arsenic, from which arsenite of lime is prepared, is slightly soluble in water, it can not be used alone without injury to the foliage, and it must be treated in some way to render it insoluble before it is used in a spraying mixture. Freshly slaked lime has been found to be the cheapest and best material for this purpose. A simple way of preparing arsenite of lime is to place one pound of white arsenic and two pounds of lime, that has been freshly slaked, in two gallons of water, and boil it for forty minutes. This will furnish sufficient arsenic for 200 to 300 gallons of spraying material, although when canker worms

or potato beetles are nearly grown it will generally be advisable to increase the strength to one pound in 100 to 150 gallons. In preparing the arsenite of lime a small amount of the arsenic is dissolved in the boiling water. This at once unites with the lime, forming insoluble arsenite of lime, and the water being able to dissolve more arsenic the process is continued until all of it has been changed into arsenite of lime. If added to Bordeaux mixture its bouyancy in the water will be increased, but when added to clear water it remains longer in suspension than does paris-green. Unless the arsenite is used with Bordeaux mixture it will always be advisable to add two pounds of lime to each barrel of water, to lessen the danger of injury to the foliage and to increase its adhesive qualities.

Another method of preparing arsenite of lime is to boil it with three or four times its weight of salsoda and, when the arsenic has dissolved, add the solution either to Bordeaux mixture containing an excess of lime, or to water in which three pounds of lime has been added to each barrel. Nothing is gained by the use of the salsoda, while it adds fifty to seventy-five per cent. to the cost of the spraying material.

Of the remedies against sucking insects, kerosene is most commonly used. Formerly it was emulsified, either with hard soap, soft soap, or whale-oil soap, and diluted according to the nature of the insect and the plants to be sprayed. For many of the plant lice and soft-bodied insects, one part of kerosene can be used in fifteen parts of diluted emulsion, and this can be used with safety upon nearly all plants, but for use upon trees during the growing season it is advisable to increase the amount of kerosene to one part in 10. Against many of the scale insects the best results can be secured with winter applications, when the strength can be increased to one part in four of the diluted emulsion. During the last few years several pumps have been invented for making mechanical emulsions of kerosene and water. The materials are placed in separate receptacles, from which they are drawn into the pump, where they are mingled and forced through the nozzle as a fine mist. All of the pumps do fair work, but they are not entirely satisfactory, as constant watchfulness is required to secure a uniform mixture. The proportions for the mechanical emulsions are the same as given above, and while less likely to injure the foliage than the soap emulsions, they will be found even more effectual as insecticides.

Clear kerosene and crude petroleum have also been used as remedies against scale insects, but while they can be relied upon to kill the insects, great care is required in their use, as they may injure and even kill the trees. The effects vary with the age and species of the trees, as well as with the condition of the growth and the weather at the time the spraying is done.

While many of the chewing insects can be destroyed with kerosene, its use for the purpose is not to be recommended, as it is only effectual against

such insects as are upon the trees at the time the spraying is done and as are reached by it; on the other hand, the arsenites are effectual against this class of insects as long as they remain on the trees.

Our cultivated plants are subject to the attack of one or more species of parasitic fungi, which act upon the foliage, fruits or other green parts and not only rob the host plant of the nourishment needed for its growth, but by destroying the tissues, lessens its ability to assimilate food and convey it to the growing portions. When the fruits are attacked serious harm is often done, as in severe cases they may be entirely ruined, and at best they will be reduced in size and rendered unsightly. Among the more troublesome diseases are the mildews and rots of the grape, scab and bitter rot of the apple, leaf-blight and cracking of the pear, leaf-curl of the peach, blight and rot of the potato, and the leaf-blight, commonly called "shot-hole fungi," which attack the plum, cherry, peach, strawberry, raspberry, blackberry, currant, gooseberry and other fruits, for all of which effectual remedies have been found. At first thought, the list seems a formidable one and the process of spraying very complex. In fact, the experiments conducted during the past twelve years have greatly simplified the spraying operations. Although one or two others may be occasionally employed, the principal reliance is placed upon a single preparation, and this can be applied at the same time as the arsenites.

Fungi are microscopic plants which penetrate the tissues of their hosts with minute threads and absorb the cell contents. When the conditions are favorable, reproductive bodies known as spores are formed. These are minute structures, generally oval in form, which later on fall or are carried by the wind to healthy portions of the same or other plants, where they germinate and enter the tissues of the new host. A certain amount of moisture and a favorable temperature are required for the germination of the spores. Under suitable conditions the fungi reproduce themselves quickly and thousands of spores may be formed upon a small area.

The extent to which plants are subject to the attack of fungi depends not only upon the conditions being favorable to the growth of the parasites, but, upon their being unfavorable to the growth of the plants themselves. As a rule, when plants have been weakened they are not only more subject to attacks of parasites than those that are making a normal growth, but the injury will be more severe. Lack of plant food or of water, and over-bearing are frequently the cause of weakness in plants, but it may be due to unfavorable climatic conditions or unsuitable soil. On the other hand, it often happens that the plants that are making the strongest growth are most subject to attack. This is especially true during dull, wet weather, when the new tissues are likely to be soft, and afford easy access to the spores of fungi. This is so noticeable that many persons attribute such fungi as leaf-curl of the peach, the blight of the potato, pear-blight and many other diseases, which are seldom troublesome except under certain climatic conditions, to the "weather."

Before any attention is given to the use of fungicides, it can be readily seen that every endeavor should be made to first afford, so far as possible, the most favorable environment to the crop. Much can be done by selecting varieties little subject to attack, and by planting them where the soil and elevation are favorable, but the importance of avoiding a check to the growth should not be overlooked. There are a large number of crops that can be saved from the attack of fungous diseases without spraying by controlling the water supply through under-draining in wet soils and for moist seasons, and irrigating when the weather is very dry. Frequent shallow cultivation during periods of drought will often have such an effect in preventing a check to the growth of the crops, by conserving the moisture in the soil, that they may be little if any injured by the attack of fungi, while uncultivated crops, that otherwise are growing under the same conditions, may be ruined by them. The supplying of plant food in suitable kind and amounts and preventing the over-bearing of the plants, through thinning or pruning, will also be of great value in lessening the check in their growth and preventing injury by fungi.

Under the most favorable conditions, however, there are many crops that can not be grown successfully, unless attention is given to spraying them with suitable fungicides. This is particularly true of our tree and bush fruits, and many of our best growers spray their trees as regularly as they feed their animals. Even though the trees are not in bearing, the spraying is not neglected, as the injury done to the foliage will seriously lessen the growth and prevent, in part if not entirely, the development of fruit buds for the crop of the coming year.

The material most commonly used as a fungicide is sulphate of copper, of blue-stone. It is employed either by merely dissolving it in water, or in a form known as Bordeaux mixture. Whatever form is used, fungicides are only effectual as preventives, as after the spores have germinated and the germ-tubes have worked their way into the host plants spraying will have little effect. The various copper compounds used as fungicides will not only so act upon the spores with which they come in contact as to prevent their germination, but if a leaf has received a thin coating with a fungicide the germ-tubes from spores that fall upon it can not enter its tissues. On the other hand, even though the plants have been sprayed, if the spores fall upon spots that have not been coated with the fungicide, the germination of the spores and the infection of the leaves will not be prevented. From this it will be seen that satisfactory results can not be secured from the use of fungicides unless they are applied early and thoroughly, and the treatment is repeated sufficiently often, during the period they are subject to infection, to keep the tissues covered with the fungicide.

To destroy the spores and mycelium that may have wintered upon the twigs, it is advisable to spray the trees in the early spring with a solution of copper sulphate. At this time it can be used as strong as

one pound in 15 to 25 gallons of water, without danger of injury to the bark or buds, and these strengths are commonly used, but from the fact that the germination of nearly all spores can be prevented by the use of solutions containing as little as one part of copper sulphate in 10,000 parts of water, it seems possible that the strength could be considerably reduced without lessening the efficiency of the fungicide. When it is not desirable to use Bordeaux mixture, from fear of spotting the foliage or fruit with lime, a weak solution of sulphate of copper is often substituted, the strength being reduced to prevent injury to the tender foliage. One part in 2,000 parts of water can be used with safety upon all plants that can be sprayed with Bordeaux mixture of standard strength, and if applied as a fine mist, upon warm, bright days, one part to 3,000 parts of water can be used upon any of our fruits. The copper sulphate solutions act quickly, do not spot the foliage, are inexpensive, and are easy to prepare and pleasant to apply, but they are quickly washed from the plants and their effects are not nearly as lasting as the more adhesive Bordeaux mixture.

From the time the growth of the trees starts in the spring, until the first of July, and in some cases the first of August, they should be kept covered with a fungicide, and for this purpose Bordeaux mixture is most commonly used. As usually prepared, it consists of five pounds each of sulphate of copper and lime, in fifty gallons of water, but for use upon tender foliage and late in the season it is advisable to reduce the amount of lime and sulphate of copper to four and even three pounds in fifty gallons of water. Care should be taken to use only a good quality of lime and that it is not air slaked. While a large amount of lime may be slaked and a stock solution of copper sulphate can be made to advantage, it is not advisable to mix any more than will be used during the day.

In preparing the mixture if fifty pounds of sulphate of copper have been dissolved in fifty gallons of water, to make fifty gallons of the mixture five gallons of the solution should be diluted so as to make about twenty-five gallons. What is thought to be an equal amount of lime should also be diluted to the same extent, and the two should be poured together slowly, stirring the mixture thoroughly at the same time. Prepared in this way, the mixture will remain in suspension much longer than when the dilution is made after the lime and sulphate of copper solution have been mixed. If Paris green or arsenic of lime are to be used with Bordeaux mixture, it is best to add them to the diluted lime water before it is mingled with the sulphate of copper solution.

To prevent injury to the foliage, it is of the utmost importance that a sufficient amount of lime be used to neutralize the copper sulphate, and to determine this a simple test is often used. After the two have been thoroughly mixed, if a few drops of a solution of ferrocyanide of potassium are added, the mixture will turn a chocolate brown if the amount of lime is deficient. To correct the difficulty, it is merely necessary to

add more of the lime water, until no change in the color can be produced by the test. Another test is to dip a knife blade, or piece of steel, into the mixture and it will be coated with copper if the lime is deficient.

While a barrel will answer for holding the mixture, if only a few trees are to be sprayed, it is best where the acreage is large to use a half-round stock tank with a tight cover, upon an ordinary farm wagon gear. This will hold enough for several hours' spraying, will make it possible to turn readily in the orchard, and will afford an elevated platform from which to spray. There are several easy working pumps adapted for orchard spraying, which can be operated much easier than those formerly used. The valves and all working parts should be of brass, and they should have provision for attaching at least two lines of hose. Some of the larger pumps will carry four lines. For ordinary orchards, hand pumps will give the best satisfaction. None of the pumps worked by gearing from the wheel will be found desirable for orchard spraying, although for vineyards and bush fruits some of them are fairly satisfactory. A number of spraying outfits using compressed air for propelling the mixture have been tried, and in some respects give excellent results. Gasoline and steam engines for working the pumps have also been considerably used by large growers.

In order that all parts of the trees may be covered it is best to have a nozzle that will make a very fine mist. The Vermorel and Bordeaux nozzles give the best results, and as they are so arranged that two, three, and even four nozzles can be attached to each line of hose, the trees can be covered very rapidly. As it is not possible to throw the spray more than four or five feet with these fine nozzles, it is advisable to use a bamboo or gas-pipe extension rod to elevate the nozzles when spraying tall trees. To hold the pressure and prevent loss of material when passing from tree to tree, there should be a shut-off valve at the lower end of the rod.

The following is suggested as an outline for the spraying of orchards: During the early spring spray all trees and bush fruits with a strong solution of sulphate of copper. For leaf-curl of the peach this should be applied at least three or four weeks before the flower buds open, and one thorough application will suffice. When the flower buds are about one-half developed, but before any of them have opened, spray with Bordeaux mixture and an arsenite; as soon as the fruit has set, repeat the application and in two or three weeks spray again with the same materials. Where the apple scab, codling moth, or any of the leaf blights are troublesome, it will be advisable to go over the trees early in July, but ordinarily two or three applications of Bordeaux mixture will give quite satisfactory results. Occasionally it will be desirable to use a fungicide when the fruit is nearly grown, and a weak solution of the sulphate of copper may be applied without spotting the fruit. The use of the arsenites and copper preparations, as recommended above, will be found effectual against the cod-

ling moth, tent-caterpillar, canker-worm, the curculio of the plum, peach, and cherry, and the other troublesome chewing insects. It will also hold in check nearly all of the more troublesome fungous diseases. Careful experiments in the use of Bordeaux mixture show that the foliage can be preserved and a good growth secured, and that 90 to 95 per cent. of the fruit will be free from the injury of fungi, when upon unsprayed trees there will be few leaves, the growth will be short and poorly ripened, and from 90 to 95 per cent. of the fruit will have suffered from the attack of fungi.

The more intelligent and progressive fruit growers already appreciate the importance of spraying their orchards, and they not only receive their rewards in the way of greatly increased cash returns, but they will have the satisfaction that always comes from well-directed, successful efforts.

DISCUSSION.

The President: Will the Bordeaux mixture or copper solution alone kill the spores?

Professor Taft: It will prevent their germinating, and in time will kill them. The main object is to prevent the germination, or if they be germinated, to keep the germs from entering the leaves themselves.

Professor Van Deman: I wish you would state whether you think the use of sal-soda in making this arsenical preparation is valuable or not.

Professor Taft: I have used it, but not for the last three or four years. Professor Van Deman refers to the preparation of arsenic by first dissolving it with sal-soda, using half a pound of arsenic to three or four pounds of sal-soda and making the solution, and then adding the lime in the same way. It is a little easier to dissolve it in that way.

Professor Van Deman: When you have made the solution without the sal-soda I find it best to boil for forty minutes. The object in boiling is to dissolve it rapidly.

Mr. Burton: Are there any poisonous fumes arising in this boiling?

Professor Taft: We have never seen any. We boil it in a comparatively small room, and we still live.

Mr. Tilson: Do you use this copper sulphate solution before the leaves start in the spring?

Professor Taft: Yes, before the buds open. As you are aware, the fungus is upon the leaves, hence you will not have a complete remedy in spraying at this time.

Mr. Burton: Do you spray when the wind is blowing?

Professor Taft: It is utterly impossible to spray against a wind.

Mr. Tilson: Is there any way we common fellows can tell whether white arsenic or Paris green has been adulterated?

Professor Taft: There is no way you can tell certainly, but ordinarily by adding ammonia to a small amount of Paris green, that makes an effective test. Paris green, if pure, will dissolve in ammonia. It only takes a small amount of the Paris green for the test, and a teaspoonful of ordinary ammonia water is sufficient. You can put it in a glass vessel of any kind.

Professor Green: You will know if there is any sediment it is not pure.

Mr. Swaim: Have you had any experience applying these remedies in dust form?

Professor Taft: I have used quite a number of patent preparations. Many of them applied when the plants are covered with dew will be found quite effectual, but the Bordeaux mixture as a powder is not as effectual as when it is used as a liquid.

Dr. Wells: After the use of these arsenical preparations is there any danger to stock pasturing on the grass under the trees?

Professor Taft: Not if the proper amount has been used and has been properly used. Grass beneath such trees has been collected and analyzed, and has been fed to stock.

Professor Cook: Ten years ago I made some very exhaustive tests, using material two or three times as strong as required, and greatly increased the amount of drenching of the trees and ground, and sheep and horses pastured under the trees were not injured.

Mr. Tilson: I have some trees in my orchard that are of no account—the apples are no account. Is it necessary that all that orchard should be sprayed, and is there danger of carrying the spores from those trees not sprayed to the others?

Professor Taft: I think it is desirable to spray all the trees, especially so far as insects are concerned.

Mr. Phelps: Should there be any difference in the strength of the solution for pears, cherries, plums and apples?

Professor Taft: I have used the same with all except the peach and the Japan plum. I reduce the strength for them, although I have used

the Bordeaux mixture at the strength I have given you on the Japan plum and had no ill effects. It is much like the peach, however, in its foliage, and I prefer to reduce it to the extent of about one-third, and instead of using five pounds in fifty gallons of water, I would use three.

Professor Van Deman: It is important in this white arsenic preparation with the lime or sal-soda that these ingredients shall stay mixed all through. This is better than Paris-green because Paris-green has little crystals which settle at the bottom, just as lime settles in the bottom of whitewash. If we use the white arsenic preparation then we have an equally strong preparation for a long time. I don't see why we should use Paris-green any more at all.

Professor Taft: I wish that were so, but I hardly think it is the fact. If it were so the arsenic would burn the foliage and it would not be safe to use it. The object of using lime is to neutralize the acid, and keep from burning the foliage. The red color is the test, and if it makes that, you should use more lime.

The President: In regard to the use of paris-green, especially in the past year's experience, we can increase the amount of paris-green to $1\frac{1}{4}$ pounds in 50 gallons of water, invariably with lime. It counteracts the effect of the arsenic on the apple. I presume we could not use that strength on the plum, the cherry, or the peach—especially the peach. I think we can on the pear. But in some cases we are troubled with certain caterpillars or larvae in the spring. It does not affect the Palmer worm at all, but when we increase it to a pound or pound and a quarter to the barrel, we then find it useful. It takes a very strong dose.

Mr. Davis: I would like to ask the Professor if he has ever found anything in his experience in spraying in the way of causing bitter rot?

Professor Taft: In our orchards we have no trouble from this. We have sprayed all our trees, and have had no bitter rot. In other sections, especially where they are growing the Baldwin, they have some trouble, but they have found that spraying the first part of July has done first-rate. In southern Michigan and the southwest part of the State they have had a good deal of trouble the last two or three years.

Mr. Davis: What do you spray with till the first of July?

Professor Taft: Bordeaux mixture.

Mr. Henby: I would like to ask what you use the Bordeaux mixture on the Japan plum for against the curculio?

Professor Taft: We spray our orchards complete. As we have only small areas of plums I have not taken the trouble to make up a lime

preparation designed entirely for the curculio. The use of the Bordeaux mixture will lessen the brown rot, and hence I would spray the plums for that. I do not consider any of these materials entirely effectual against the rot.

Mr. Burton: Can you control the curculio by spraying?

Professor Taft: Yes; I think it advisable to spray all our fruit trees with Bordeaux mixture, and we can apply the arsenic with that, and thus increase the efficiency.

The President: I would like to give a little illustration of the idea some people have about spraying. I happened in one of the city stores here in the city in the spring, and there were in that store a couple of farmers from down in the country. One of them wanted to purchase some material to spray plum trees with; the other wanted a pump. The proprietor handed down a small brass arrangement worth about three dollars. He couldn't stand that price; he wanted a little tin pump to cost one dollar, and he wanted to spray his orchard with it. The fellow who wanted the mixture was buying a half gallon of Bordeaux mixture, I think it was in solution, to spray his plum trees for curculio. You see we have not got the people of Indiana up to the proper idea of spraying.

Mr. Johnson: One of our druggists had a preparation of Bordeaux mixture put up by a firm in this town. Is there anything of that kind put up that is reliable? I always made mine. They put it up in pound packages. I don't know whether it is reliable or not.

The President: I know nothing as to the mixture, and can not answer the question. There are dry mixtures of some of these preparations which are all right, and which are put up in good shape.

Mr. Burton: A druggist in our town received some of this dry preparation and gave me a package sufficient for one barrel. I did not use it. The price was to be seventy-five cents; that was about three times what it would cost to make it myself, so I did not care to use it after he gave it to me.

Mr. Phelps: To spray Japan plums with whitewash—would that do any good for the curculio?

Professor Taft: It would help.

Mr. Shoemaker: I would like to ask the Professor about spraying plums, as to when is the best time to spray? I have not been successful in my spraying in fighting the curculio. I have been told that the fault lay in not spraying just at the right time. The curculio you know does not live on the foliage, and therefore I do not know just how to reach it and destroy it.

Professor Taft: One rule is to spray the plum, cherry, pear and apple just before the blossom opens, and just afterward. Regarding the curculio eating the foliage, I am convinced it does in the adult state before it deposits its egg. It is possible, and probable, also, that if you spray the trees thoroughly you will place some of the arsenic in the cavity where the egg is laid, and the young larvae will also be killed. I have been able to save a crop of plums in this way. As a rule I would never spray a fruit tree while the petals are showing, yet I sometimes advise it. The reason is that we have in Michigan many orchards infested with canker-worm, and if spraying is neglected they will destroy the foliage, and if you delay the spraying until the blossom has entirely fallen, you may lose the foliage and perhaps the entire crop of the season. We never think of spraying while the flowers are open.

Mr. Shoemaker: Why not?

Professor Taft: So far as insects like the codling moth are concerned, we get no benefit from it. We must deposit the poison inside the flower, and this cavity of calyx at that time being occupied with the stamens and pistils, it will not receive the poison. Another reason I would consider of great value is that it destroys the bees and injures the bee-keeper, and I consider the honeybee a friend of the fruit-grower in the fertilization of the fruit.

Mr. Simpson: I knew a man in Illinois last year who sprayed a very large orchard after the bloom was half over, and he had a number of stands of bees in the orchard, and he saw no ill effects from that.

Professor Van Deman: I was just over at the Illinois horticultural meeting, and I heard the question squarely put to Professor Blair, at the head of the Horticultural Department of Illinois University, Agricultural College and Experiment Station, "Does the spraying of the trees while in bloom kill any of the bees?" He said he had found that some of the bees had been killed. He did not wish to give a definite statement one way or the other with regard to whether or not spraying should or should not be done at blooming time, because, he said, their experiments had only begun, and they expected to continue them for two or three years before they made a publication on the subject. But he did say they found dead bees under the trees that had been sprayed, and that chemical analyses had been made of those bees, and arsenic was found in the bees.

Mr. Burton: I think with reference to the case Mr. Simpson refers to last spring in spraying apple trees when they were in bloom, that there was nothing in the bloom to attract the bees, and we might have had hundreds of hives in the orchards and sprayed all the time and not have killed the bees. We had an east wind all the time during the blooming period, and except just at the close of the blooming season, the bees did not appear on the blossoms at all.

Mr. Simpson: This man stated that the bees were working in the trees all the time. It killed the codling moth, and he had good apples and fine ones. I have heard beekeepers say the bees do not eat the honey, but just simply carry it to the hive, and for that reason it did not kill them.

Mr. Davis: I was right in the heart of the fruit district of California two years, and there they paid no attention to the time of the blossoming season that they sprayed, and there they had thousands of stands of bees all over that country, and they claim that the bee sucks the honey through a little tube and it does not enter the mouth or get into the stomach at all. They pay no attention to the blooming. They spray whenever they get ready and as much as they want to. That was a great fruit county and a great bee county. Bakersfield was the place.

Thereupon the convention adjourned until Thursday morning.

THURSDAY MORNING.

The report of the Committee on Finance was read and adopted as follows:

We, your Committee on Finance, to whom was referred the Secretary's and Treasurer's reports, have examined the same and find them correct.

GEO. P. CAMPBELL,
SNEAD THOMAS,
AMOS GARRETSON,

Committee.

The report of the Committee on Resolutions was read and adopted as follows:

Whereas, The fruit industry in Indiana seems to be on the decline, and

Whereas, This Society can do but little without money,

Resolved, That we ask the next Legislature to give us an appropriation adequate to our needs, which we think would be \$2,000.

Resolved, That every member of this Society constitute himself a committee of one to see his legislator before the opening of the next session and lay this matter before him.

Resolved, That we try to interest the County Commissioners in a county horticultural experimental station in every county of the State.

Resolved, That we recommend the business of spraying as worthy the attention of young men in all our fruit-growing counties.

MRS. W. W. STEVENS,
H. D. SIMPSON,
J. C. GROSSMAN,

Committee.

PLACE OF SMALL FRUITS IN THE ECONOMY OF THE FARM.

JOHN TILSON, FRANKLIN.

Indiana is justly boastful of her educational system—of its elevating and refining influence. It is no longer regarded sufficient that the youth of Indiana shall be able to read and write and cipher. As a consequence we have high schools and universities. It means not only thorough education, but complete education. It means strength and beauty. It means that in the homes of Indiana there shall be culture and refinement, a taste for and an appreciation of the beautiful in art and nature. Purdue is doing this for our farmer boys and girls, and can and will do more if they can get the proper encouragement from the State. Teach them to love the beautiful in nature, and above all, teach them to love and be contented with their home on the farm. We have made rapid progress in agriculture, and in the raising of fine and improved stock, horses, cattle, hogs and sheep, until Indiana is now right at the top in all of the above, but how is it with horticulture? With the general farmer it is sadly neglected. Especially is this the case with the culture of small fruit. I speak from actual observation that there is not 25 per cent. of the general farmers that raise enough of what we call small fruit—strawberries, raspberries, in fact, all the berry family—for their own family use.

Then as to the place of the small fruit in the economy of the farm—the consumption of fruit daily would be conducive to health, especially in the summer and autumn months, from the time strawberries are ripe in May until grapes in August, until, if properly cared for, October and November. Then if eating an abundance of fruit is conducive to health, is it not economy to raise it? If farmers don't raise it they won't have it, for as a rule they will never buy enough for family use. The using of much fruit is not only healthful, but the great pleasure and happiness of raising and having it is worth something. He will learn to love his plants and shrubs, learn to love the beautiful, will want to branch out and raise flowers, if not for his own pleasure, that he may please his wife and daughters, for is not the greatest happiness in making others happy? It is not the fault of woman that there is not always an abundance of fruit and flowers in season on the table at every meal. It is the fault of the man every time. With rural mail every day, with hucksters, coal oil, ice, etc., delivered at the door, there remains no excuse for the man to spend his leisure time in town and at the village store, talking politics and running the government. In winter study and plan how to make home more attractive; then in the spring and summer execute these plans. This will help to solve the problem of how to keep the boy on the farm, also another problem, how to keep the wife on the farm. Statistics

show that there is a greater per cent. of farmers' wives in insane asylums than of any other calling. Why is this? It is certainly not the hard work, but sameness, doing the same old thing the same old way, diet of hog three hundred and sixty-five days in the year. I had an occasion some time since to canvass our county for a local farmers' insurance company. I stopped one night with a farmer who owned, as he told me, three eighties and a forty—plenty of stock of all kinds. I went out with him to feed. After feeding horses and hogs, he brought a basket of nubbins up a muddy lane to cow troughs, called his wife, and we watched her milk four cows in three to four inches of mud in fence corners. After supper I ventured to ask (for I saw he had none) why he had never set out any small fruit—strawberries, for instance. His answer was, "'Cause 'twon't pay; no money in it. I bought a quart of strawberries last summer; just a waste of sugar." Then the old lady let loose. "No, there is no fruit nor a flower on this farm, except what few apples on them trees out there, planted over forty years ago. It's just work, work here until sometimes I think I can't stand it any longer. I want to move to town; he won't do that."

In a short time after that the old lady was taken with what the doctor called nervous prostration, lost her mind, is now gone, we hope, to a happier land, where her toils are over. There is economy in raising small fruit on the farm; if rightly managed it can be made a source of revenue. It does not necessarily take the time of the farmer from other duties. The planting comes at a leisure time. We can always get boys and girls who need the work to pick our berries. There never has been a time in my locality, and I don't think will be soon, when we can't sell enough right at home to more than pay for picking and for sugar to put up our own fruit. But, laying aside all money value, can not we claim for horticulture a heaven-ordained rank such as belongs to no other occupation known to the human family. Did not God himself plant the first garden and there put man, whom he had formed? "And out of the ground made the Lord God to grow every tree that is pleasant to the sight and good for food," the second chapter of Genesis, fifteenth verse, reads: "and the Lord took the man and put him in the garden of Eden to dress it and to keep it."

Mr. Campbell: I want to ask a question or two with reference to the small fruits, such as strawberries and raspberries, and I want to ask what the prospect is for next year's crop. One of my neighbors, one of the largest raspberry growers in our county, claims his raspberry canes are already dead. He has cut part of them down already. He is at a loss to know what is the matter. He told me he never had a finer crop than this year. The leaves dropped prematurely, and then the fall rains set in and they started new leaves so late they did not amount to anything. Since that his canes have all died. I would like to know if anyone knows the cause?

The President: I suspect the cause is the anthracnose. It is a fungus. It is very common over the State.

Mr. Henry: You remember a year ago last winter we had a severe winter and continued cold weather. It was below zero for several weeks and no snow. That winter no doubt hurt the raspberries and grapes and blackberries. It hurt their roots, and I don't think they have got over it yet. I know my grapes have not. Last year all through our neighborhood the grapes were almost an entire failure, and I think it was on account of the cold, hard freezing.

The President: No doubt that had quite a good deal to do with the weakened condition of the canes.

Mr. Henby: The moral is, do not cultivate your raspberries and blackberries and grapes, etc., too late in the season. Let the weeds and grass grow around their roots, as they are a good protection.

Mr. Reed: I think the anthracnose has more to do with it than anything else. I have had two acres this season that made an exceedingly good growth. They are one-half dead now. I have also another half acre in an orchard, and when spraying the orchard I spray the raspberries. That patch has done better this season than ever before. Off of three-fourths acre I picked 100 cases of 24 quarts each, and they are in equally as good shape for the coming season. Those that were not sprayed at all show very bad.

Snead Thomas: I have in mind two raspberry growers in my locality; one adjoins my place, and he is a rather careless cultivator; he has the anthracnose very bad. I made the remark the other day that if those were my raspberries I would plow them down. There is another man a mile further south who has been very careful in keeping the anthracnose stamped out, and he has as fine raspberries as I ever saw.

Mr. Henby: There is only one sure preventive for anthracnose, and that is thorough cultivation. If we want to protect our raspberries in winter we sow oats in August. We also do that with our strawberries.

Mr. Kingsbury: When do you sow the oats?

Mr. Henby: Anywhere from the 1st to the 20th of August.

The President: If there is no snow it becomes very important that we have some artificial mulch to take the place of snow. The oats will do that very effectually, and it is dead in the spring and out of the way when you want to cultivate.

Mr. Swaim: While I believe thoroughly in cultivation, I can not agree with Mr. Henby that cultivation is a sure preventive of anthracnose, be-

cause I have seen it very bad on the ground of some of our best cultivators. I believe the only real remedy is the Bordeaux mixture.

Mr. Phelps: Did any one ever try the sowing of turnips about the first of August for mulch?

The President: That is all right.

Mr. Swaim: Wouldn't there be danger of those turnips making a growth that would be difficult to get out? Oats will winter kill throughout this country.

Mr. Henby: Anything that will form a good mulch will serve the purpose. I have seen rye that makes a splendid protection, and then, say in May when it is about to head, mow it down with the scythe, and you have a protection against drouth.

The President: The trouble with rye or any of those crops is they are in the way of cultivating in the spring. The oats is out of the way.

Mrs. Stevens: I don't believe ten per cent. of the average farmers of the United States grow strawberries. But the average farmer is not here. I think the "average" farmer is the fellow we ought to strike for if we are going to do missionary work, and if the "average" farmer's wife could be convinced of the amount of lusciousness she could get from the strawberry, I think she would make it very warm for her husband so that he would be glad to raise strawberries. If the "average" farmer knew he could raise strawberries as easily as he can cabbage—and I do not believe but what the majority of people will agree to that—he would grow them, but not for the market. I do not believe it possible for the "average" farmer to grow any kind of fruit unless it is tree fruit, and I do not believe he can grow tree fruit profitably for market, for just at the time his fruit needs attention his crops need attention. It is one person's business to do the growing and another's to do the peddling. In our part of the country, and I think all through the southern part of the State, the growers are not selling their own fruit. We have fruit men who come around and buy the fruit at the orchards, and do the shipping and the peddling. The average fruit man grows and supplies his home market—that is the most profitable—and I suggest that he does not attempt to go further than that.

Mr. Anderson: I have supported a large family by small fruit raising for twenty years. I have raised all kinds of small fruit that can be raised at any profit in Indiana. Now, if you remember, some years ago you had what you called a "star list." Some one a few years ago said that did not mean anything. I beg the gentleman's pardon. I began twenty years ago. I was not only a beginner, but a new beginner, and green as a gosling in the matter. The result was that I had to depend on somebody for information, and I want to say for your good, and perhaps

I may add for your glorification, that I found double starred fruit, plenty of it. I did this after having gathered up a number of your old proceedings, and I have never failed in success wherever I have planted a double-starred fruit, and I have planted a number of them, and I have frequently failed when I did not do that. My difficulty especially has been in strawberries. I raise the Warfield and Haverland for the main crop. My market demands a cheap berry and I prolong my season with the Ganda, which is one of the finest of small strawberries. I am not going to ask you if you have anything better. I do not want anything better. All I want in the way of improvement of my strawberries is to get one that will last the year round. My patrons never get tired of crying for strawberries. I have used the Clyde a few years, and it is a perfect failure with me.

Professor Troop: I think the Clyde is one of the best berries that we can grow for the soil we have.

Mr. Davis: There is a wonderful difference in the strawberry. I have tested in the last twelve years over seventy varieties. The soil has a great deal to do with it. I do not see how you can set down any rule to go by with reference to the strawberry. The Brunette, to my notion, and that of all my customers, is one of the best berries that grows.

The following officers were elected:

C. M. Hobbs, President.

James Troop, Secretary.

Sylvester Johnson, Treasurer.

Mrs. W. W. Stevens, First Vice-President.

Geo. B. Campbell, Second Vice-President.

Amos Garretson, Third Vice-President.

J. C. Grossman, Fourth Vice-President.

E. Y. Teas, Joe A. Burton, L. B. Custer, Executive Committee.

The President, the Secretary and Mrs. W. W. Stevens were appointed a Committee on Experimental Orchard.

The following memorandum of awards to Indiana exhibitors of fresh fruits at Paris Exposition, 1900, were received and read:

TEMPORARY COMPETITION, MAY 9, 1900.

Indiana Horticultural Society awarded second prize.

Apples, Crop of 1899, Ten Varieties, Displayed in Quantity.

<i>Variety.</i>	<i>Contributor.</i>	<i>Address.</i>
Baldwin	T. T. Newby	Carthage, Ind.
Ben Davis	T. T. Newby	Carthage, Ind.
Black	T. T. Newby	Carthage, Ind.
Golden Russet	T. T. Newby	Carthage, Ind.
Hubbardston	T. T. Newby	Carthage, Ind.
Indiana Favorite	T. T. Newby	Carthage, Ind.
Lansingburg	T. T. Newby	Carthage, Ind.
Mann	T. T. Newby	Carthage, Ind.,
Newby	T. T. Newby	Carthage, Ind.
Salome	T. T. Newby	Carthage, Ind.

TEMPORARY COMPETITION, MAY 23, 1900.

Indiana Horticultural Society awarded second prize.

Apples, Crop of 1899, Five Varieties, Displayed in Quantity.

<i>Variety.</i>	<i>Contributor.</i>	<i>Address.</i>
Ben Davis	Albert Brown	Alquina, Ind.
Mountjoy	Jesse P. Elliott	Alquina, Ind.
Smith Cider	Elias Scholl	Alquina, Ind.
White Pippin	Ross Thomas	Alquina, Ind.
York Imperial	Joseph Rutherford	Alquina, Ind.
York Imperial	Joseph Rutherford	Alquina, Ind.

TEMPORARY COMPETITION, MAY 23, 1900.

Thomas T. Newby, Carthage, Indiana, awarded second prize.

Apples, Crop of 1899, Nine Varieties, Displayed in Quantity.

<i>Variety.</i>	<i>Contributor.</i>	<i>Address.</i>
Baldwin	Thomas T. Newby	Carthage, Ind.
Ben Davis	Thomas T. Newby	Carthage, Ind.
Black	Thomas T. Newby	Carthage, Ind.
Golden Russet	Thomas T. Newby	Carthage, Ind.
Hubbardston	Thomas T. Newby	Carthage, Ind.
Indiana Favorite	Thomas T. Newby	Carthage, Ind.
Lansingburg	Thomas T. Newby	Carthage, Ind.
Mann	Thomas T. Newby	Carthage, Ind.
Salome	Thomas T. Newby	Carthage, Ind.

TEMPORARY COMPETITION, MAY 23, 1900.

Single Baskets of Apples—Awarded Honorable Mention.

<i>Variety.</i>	<i>Contributor.</i>	<i>Address.</i>
Newby	T. T. Newby	Carthage, Ind.

TEMPORARY COMPETITION, JUNE 27, 1900.

Indiana Horticultural Society awarded second prize.

Apples, Crop of 1899, Five Varieties, Displayed in Quantity.

<i>Variety.</i>	<i>Contributor.</i>	<i>Address.</i>
Ben Davis	C. Rodenburg	Richmond, Ind.
Ben Davis	Alice Eliason	Richmond, Ind.
Ben Davis	Richard Sedgwick	Richmond, Ind.
Gilpin	Richard Sedgwick	Richmond, Ind.
Indiana Favorite	Dill Addleman	Richmond, Ind.
Mann	Columbus King	Centreville, Ind.
Stark	Dill Addleman	Richmond, Ind.

TEMPORARY COMPETITION, AUGUST 8, 1900.

Joe A. Burton, Orleans, Indiana, awarded second prize.

Apples, Crop of 1899, Two Varieties, Displayed in Quantity.

<i>Variety.</i>	<i>Contributor.</i>	<i>Address.</i>
Ben Davis	Joe A. Burton	Orleans, Ind.
Winesap	Joe A. Burton	Orleans, Ind.

TEMPORARY COMPETITION, OCTOBER 24, 1900.

Joe A. Burton, Orleans, Indiana, awarded first prize.

Collection of Apples, Crop of 1900.

In addition to the foregoing awards to Indiana fruit growers, in their individual capacity, or as contributors to the Indiana Horticultural Society's collections, the following varieties and contributors have entered into the several competitions made by the Division of Pomology, U. S. Department of Agriculture, to which prizes have been awarded:

COMPETITION OF MAY 9, 1900.

<i>Variety.</i>	<i>Contributor.</i>	<i>Address.</i>
Baldwin	T. T. Newby	Carthage, Ind.
Black	T. T. Newby	Carthage, Ind.
Golden Russet	T. T. Newby	Carthage, Ind.
Hubbardston	T. T. Newby	Carthage, Ind.
Lansingburg	T. T. Newby	Carthage, Ind.
Mann	T. T. Newby	Carthage, Ind.
Newby	T. T. Newby	Carthage, Ind.
Salome	T. T. Newby	Carthage, Ind.

COMPETITION OF MAY 23, 1900.

<i>Variety.</i>	<i>Contributor.</i>	<i>Address.</i>
Ben Davis	Albert Brown	Alquina, Ind.
Mountjoy	Jesse P. Elliott	Alquina, Ind.
Smith	Jesse P. Elliott	Alquina, Ind.
White Pippin	Ross Thomas	Alquina, Ind.
York Imperial	Wm. Newland	Alquina, Ind.
York Imperial	Ross Thomas	Alquina, Ind.

COMPETITION OF JUNE 13, 1900.

Black	George Ebersoll	Centreville, Ind.
Indiana Favorite	Chas. Rodenburg	Richmond, Ind.
Seedling No. 1	Enos Kitterman	Centreville, Ind.
Seedling No. 2	Enos Kitterman	Centreville, Ind.
Smith	Elmira Russell	Richmond, Ind.

COMPETITION OF JUNE 27, 1900.

Ben Davis	Richard Sedgwick	Richmond, Ind.
Ben Davis	Chas. Rodenburg	Richmond, Ind.
Ben Davis	Alice Eliason	Richmond, Ind.
Gilpin	Richard Sedgwick	Richmond, Ind.
Indiana Favorite	Dill Addleman	Richmond, Ind.
Indiana Favorite	Alice Eliason	Centreville, Ind.
Mann	Columbus King	Centreville, Ind.
Smith	R. Sedgwick	Richmond, Ind.
Smith	Dill Addleman	Richmond, Ind.

COMPETITION OF JULY 18, 1900.

Indiana Favorite	Dill Addleman	Richmond, Ind.
Stark	Dill Addleman	Richmond, Ind.

COMPETITION OF AUGUST 8, 1900.

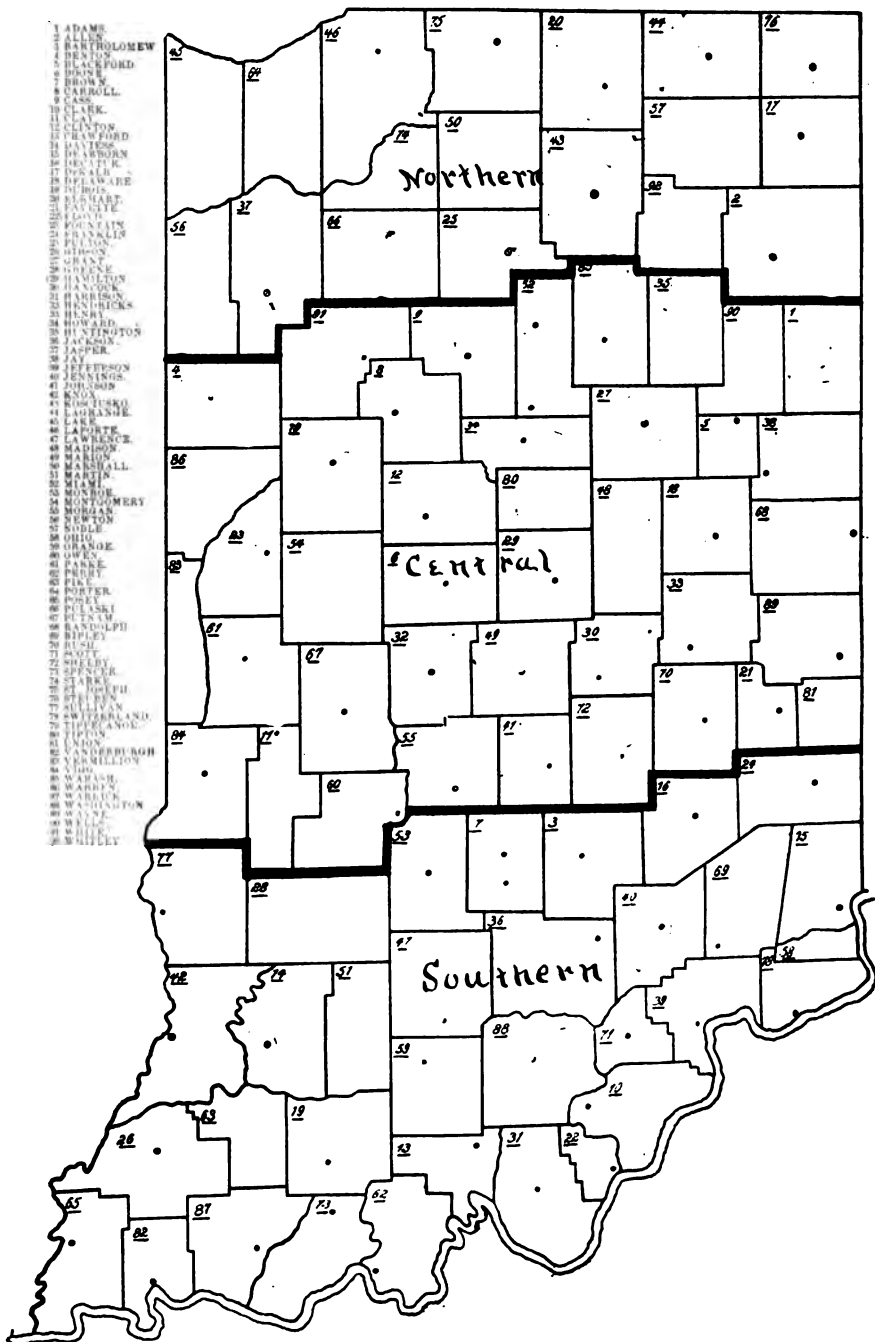
Winesap	Joe A. Burton	Orleans, Ind.
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COMPETITION OF AUGUST 22, 1900.

Winesap	Joe A. Burton	Orleans, Ind.
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COMPETITION OF OCTOBER 10, 1900.

Ben Davis	Joe A. Burton	Orleans, Ind.
Ralls Genet	Joe A. Burton	Orleans, Ind.
Rome Beauty	Joe A. Burton	Orleans, Ind.
Winesap	Joe A. Burton	Orleans, Ind.



The above is a map of the State showing the three fruit sections into which the State has been divided, in accordance with the report of the committee, found on page 477 of this volume, and also a list of varieties which are recommended for each district.

VARIETIES OF FRUITS IN DISTRICTS.

NORTHERN DISTRICT.

APPLES.

Summer.—Red Astrachan, Chenango, Yellow Transparent, Tetofsky, Red June, Sweet Bough, Early Harvest, Benoni, Oldenburg, Summer Queen, Golden Sweet.

Autumn.—Fameuse, Maiden Blush, Sweet Russet, Wealthy, Fall Pippin, Twenty-Ounce, Longfield, Rambo, Fall Wine, Gravenstein, Keswick Codlin, Alexander.

Winter.—Ben Davis, Northern Spy, Limber Twig, Willow Twig, Smith Clder, R. I. Greening, Yellow Bellflower, Rox. Russet, Hubbardston, Grimes' Golden, Jonathan, Vandevere, Talman Sweet, Stark, Rome Beauty, King, Esopus Spitzenburg, Fallawater, Wagener, Peck's Pleasant, Mann, Roman Stem, York Imperial, Swaar, Canada Red, Pewaukee, Wolf River, Sutton Beauty, Salome.

Crabs.—Hyslop, Transcendent, Whitney, Martha.

PEARS.

Bartlett, Keiffer, Angouleme, Koonce, Sheldon, Flemish Beauty, Clairgeau, Clapp, Seckle, Diehl, Onondaga, Anjou, Wilder, Howell, Lawrence.

PEACHES.

Crawford (late), Mountain Rose, Stump, Yellow Rareripe, Lemon Free, Barnard, Salway, O. M. Free, O. M. Cling, Elberta, Foster, Early York, Champion, Crosby, Heath Cling, Smock, Swan's Orange.

PLUMS.

Lombard, Green Gage, Burbank, Bradshaw, Wild Goose, Robinson, German Prune, Shropshire Damson, Newman, Guli, Abundance, Yellow Egg, Grand Duke, Imperial Gage, Pond's Seedling, Blue Damson, Ogon.

CHERRIES.

Early Richmond, Montmorency, May Duke, Louis Phillippe, Gov. Wood, Dyehouse, Black Tartarian, English Morello, Windsor.

GRAPES.

Concord, Worden, Moore's Early, Hartford, Ives, Mooyer, Delaware, Niagara, Brighton, Diamond, Pocklington, Agawam, Salem.

GOOSEBERRIES.

Downing, Houghton, Red Jacket, Champion, Pearl, Champion.

QUINCES.

Orange, Champion, Meech.

CURRANTS.

Victoria, Fay, Cherry. Red Dutch, Pomona, White Grape.

BLACKBERRIES.

Snyder, Eldorado, Stone Hardy, Agawam, Lawton, Ancient Briton, Taylor.

RASPBERRIES.

Black.—Gregg, Kansas, Ohio, Eureka, Nemaha, Conrath.

Red.—Cuthbert, Loudon, Shaffer, Columbian, Turner, Golden Queen, Miller's Red.

STRAWBERRIES.

Warfield, Bulbach, Jessie, Cumberland, Parker Earle, Haverland, Greenville, Gandy, Brandywine, Lovett, Enhance, Splendid.

CENTRAL DISTRICT.

APPLES.

Summer.—E. Harvest, Yellow Transparent, Benoni, Tetofsky, Chenango, Golden Sweet, Sweet June, Duchess, Red Astrachan, Early Joe, Kirkbridge, Red Stripe, Red June.

Autumn.—Maiden Blush, Rambo, Wealthy, Gravenstein, Fall Orange, Flory Bell, Fall Wine, Bellflower, Fameuse, Porter.

Winter.—Grimes Golden, York Imperial, Rome Beauty, Stark, Ben Davis, Ind. Favorite, Lansingburg, Roman Stem, Northern Spy, Winesap, Smith's Cider, Clayton, Moore's Sweet, W. Pippin, Fallawater, Greenville, Mann.

Crabs.—Martha, Transcendent, Whitney, Florence, Hyslop.

PEARS.

Flemish Beauty, Bartlett, Tyson, Keiffer, Lawrence, Howell, Sheldon, L. Bonne, Seckel, Clapp, Wilder, Arnold, Koonce, Vt. Beauty.

PEACHES.

Elberta, Crosby, Old Mixon, Stump, Mt. Rose, Kilbourn, Smock, E. and L. Crawford, Crosby, Alexander, Beatrice, Gold Drop, Kalamazoo, Champion, Snead, Triumph, Fitzgerald, St. John.

PLUMS.

Newman, Damson, Robinson, Lombard, Moore's Arctic, Imp. Gage, Ogon, Burbank, Abundance, Shipper's Pride, Shropshire Damson, German Prune, Lincoln, Red June, Wicksan.

CHERRIES.

Early Richmond, Montmorency, Late Morello, Dyehouse, English Morello, Gov. Wood.

QUINCES.

Missouri Mammoth, Orange, Champion, Meech.

GRAPES.

Concord, Worden, Moore's Early, Brighton, Ives, Niagara, Campbell's Early, McPike, Pocklington, Diamond, Woodruff Red, Delaware, Salem, Brilliant, Cottage, Early Victor, Green Mt., Eaton, Agawam.

CURRANTS.

Pomona, Wilder, Victoria, White Grape, Cherry, Versailles, Red Dutch.

GOOSEBERRIES.

Downing, Houghton, Champion, Pearl, Red Jacket.

BLACKBERRIES.

Snyder, Taylor, Ancient Briton, Stone's Hardy, Eldorado, Kittitiny, Early King, Erie, Agawam.

RASPBERRIES.

Black.—Gregg, Kansas, Hilborn, Hopkins, Eureka, Conrath, Nemaha.
Red.—Cuthbert, Turner, Golden Queen, Miller's Red, Loudon, Shaffer, Columbian.

STRAWBERRIES.

Warfield, Haverland, Bubach, Phillips, Greenville, Gandy, Lovett, Parker Earle, Mary, Cumberland, Brunette, Enhance.

SOUTHERN DISTRICT.

APPLES.

Summer.—Summer Rose, Yellow Transparent, Benoni, Early Harvest, Sweet Bough, Tetofsky, Red Astrachan, Red June, Chenango, Oldenburg, Bailey Sweet.

Autumn.—Maiden Blush, Rambo, Fall Pippin, Gravenstein, Fall Wine, Telpehocken, Golden Sweet, Grimes Golden, Wealthy.

Winter.—Ben Davis, Rome Beauty, Winesap, Willow Twig, Smith's Cider, Minkler, Vandevere, Golden Russet, York Imperial, Ind. Favorite, Winter Pearmain, Stark, Johnathan, Genet, White Pippin, Yellow Bellflower.

Crabs.—Whitney No. 20, Transcendent, Hyslop, Virginia Seedling, Kentucky Red Cider.

PEARS.

Bartlett, Clapp's Favorite, Wilder, Flemish Beauty, Anjou, Seckel, Keiffer, Clairgeau, Louise, Bonne Bell, Lucrative, Mt. Vernon, Angouleme.

PEACHES.

Elberta, Crosby, Old Mixon Free and Cling, Crawford, Champion, Smock, Stump, Alexander, Honest John, Flenor, Salem, Amsden, Troth's Early, Heath Cling, Snow, Yellow Rareripe, Globe, Lemon Free, Lovett's White, Wonderful, Summer Snow.

PLUMS.

Lombard, Abundance, German Prune, Green Gage, Moore's Arctic, Shipper's Pride, Yellow Egg, Ogon, Imperial Gage, Miner, Wild Goose, Newman, Burbank, Damson, Robinson.

CHERRIES.

Early Richmond, English Morello, Montmorency, Black Tartarian, Gov. Wood, Dyehouse, Windsor, Yellow Spanish.

QUINCES.

Orange, Missouri Mammoth, Champion.

GRAPES.

Concord, Worden, Niagara, Moore's Early, Diamond, Delaware, Norton's Virginia, Catawba, Pocklington, Clinton, Brighton, Ives, Prentiss, Hartford, Lady, Perkins, Martha.

CURRANTS.

Red Dutch, Fay's Prolific, North Star, Cherry, White Grape, Pomona, Versailles.

GOOSEBERRIES.

Industry, Downing, Houghton, Champion, Crown Bob.

BLACKBERRIES.

Taylor, Snyder, Erie, Wilson Jr., Stone Hardy, Early Harvest, Early King, Ancient Briton, Lawton, Eldorado.

RASPBERRIES.

Black.—Gregg, Ohio, Kansas, Conrath, Eureka.

Red.—Royal Church, Cuthbert, Shaffer, Columbian, Miller's Red, Turner, Brandywine.

STRAWBERRIES.

Cumberland, Crescent, Jessie, Bubach, Haverland, Warfield, Enhance, Gandy, Sharpless, Parker Earle, Greenville.

THE ORIGINAL CONCORD GRAPE VINE.

CHAS. E. NEWLIN IN INDIANA FARMER.

I thought your readers might be interested in a little "horticultural history" which has been of great interest to me. Perhaps few of those who annually feast on the luscious Concord grapes ever stop to think where the variety originated or when or by whom it was first cultivated. An hour's ride northwest from Boston, through historic old Cambridge and Lexington, is this quaint little scattered town of Concord, where the first battle of the Revolution was fought, April 19, 1775, though the little skirmish at Lexington on the way out here is usually given that distinction. After a walk out two miles over the fir covered hill to Walden Pond, where Thoreau's happy hours were spent in the little hut on its shores, and back to a New England dinner in Wright Tavern, built in 1747 and used ever since as a tavern (it was here the English General Pltemairn got drunk before the battle of Concord), I wandered out the old Lexington road, past Emerson's home, where his daughter still lives, and past the Alcott home, where "Little Women" was written, and in whose dooryard, by the foot of the hill, stands the plain unpainted "Concord School of Philosophy." A little farther on is "Wayside," the "House

of Seven Gables" (and it has them), where Hawthorne wrote "Scarlet Letter" and where his daughter, Mrs. Lothrop, still lives.

Next door to this historic house stands "Bull's Cottage," in whose door yard still grows the first "Concord" grape vine, from which stock the unnumbered millions of vines of this variety came. The vine is now enclosed in close lattice work, around and above, to keep vandal relic hunters, like myself, from carrying it away by inches. On one side hangs a square oak board on which these words are burned most artistically: "I looked about to see what I could find among our wildings. The next thing to do was to find the best and earliest grape, for seed, and this I found in an accidental seedling at the foot of the hill. The crop was abundant, ripe in August, and of a very good quality for a wild grape. I sowed the seed in the autumn of 1843. Among them the Concord was the only one worth saving. Ephraim Wales Bull."

This is the simple story of the origin of the greatest grape ever produced. Mr. Bull was born March 4, 1806, and died September 26, 1895. Mrs. Lothrop then bought the grounds of her father's old friend, and is keeping the quaint old cottage and its surroundings in perfect repair, just as Mr. Bull left them, except for a little addition to the back for the accommodation of the renter. On the mantle piece in the sitting room she has had daintily painted this "confession" of Mr. Bull: "I confess I did not expect to arrive at so great a success so soon, but when I had the good fortune to find the Concord among the first crop of seedlings, the thought dawned upon me that in the perhaps far off future higher success awaited the cultivator who had the patience to wait. I had almost said also the courage to venture, for I was sensible that any attempt to improve the wild grape would be considered an imputation upon the judgment and sagacity of the operator. Fully aware of this, I kept my own counsel, and if I had not succeeded nobody would have known that I had ventured."

And above the old fire place in the dining room is painted: "Final summing up of 37 years work from over 22,000 seedlings, 21 grapes which in the light of to-day I consider valuable. I had at one time 125 vines which I thought worth saving, but, grown more critical with every new success, I have discarded most of them." What a world of patience and love of his work this discloses; I was told by one of Mr. Bull's old neighbors that the original wild grape which was found ripening in August Mr. Bull found on the banks of Concord River, just a little above the old bridge where the "Battle of Concord" was fought and where now stands that marvelously beautiful statute, "The Minute Man," on the base of which is carved:

"By the rude bridge that arched the flood,
Their flag to April's breeze unfurled,
Here once the embattled farmers stood,
And fired the shot heard round the world."

Just across the meadow on the little hill stands "The Old Manse," sacred to all lovers of good literature.

Knowing the classic surroundings of the birth of the Concord grape, perhaps some of our readers will enjoy a little more the refreshing fruit from their own vine descended from this parent vine, which old Ephraim Wales Bull gave to the world 58 years ago.

REPORT OF THE STATE ENTOMOLOGIST.

[Submitted to the Horticultural Society for publication.]

To His Excellency, James A. Mount, Governor of the State of Indiana:

Sir—In accordance with the provisions of Section eleven (11), Chapter thirty-eight (38), of the General Laws of 1899, I herewith submit my second annual report of work done and expense incurred by this office during the fiscal year ending October 31, 1900. Section 1 of the Nursery Inspection Laws reads as follows:

Be it enacted by the General Assembly of the State of Indiana, That all nurseries in Indiana where trees, shrubs, vines, plants or other nursery stock are grown and offered for sale, shall be inspected by the State Entomologist at least once each year, not earlier than June 1, nor later than October 1, at such times as he may elect, and he shall notify in writing the owners of such nurseries, the Secretary of the State Board of Agriculture, the director of the State Agricultural Experiment Station and the President of the State Horticultural Society of the presence of any San Jose scale or other destructively injurious insects or fungi on trees, shrubs, vines, plants or other stock of such nurseries, and shall notify, in writing, the owner of any affected stock that he is required on or before a certain day to take such measures for the destruction of such insects or fungous enemies of nursery stock as have been shown to be effectual for this purpose.

Section 8 reads in part as follows:

Whenever a nurseryman, fruit grower or agriculturist in this State shall know or have good reasons to believe that his trees, shrubs, vines or plants are affected with San Jose scale, yellows, rosette, or other destructive insects or fungus enemies, he shall have the privilege, and it shall be his duty to notify the State Entomologist, who shall proceed in person or by his assistant, to examine the same without delay, and advise the proper remedies for the destruction of such insects or fungus enemies of nursery stock that may be present.

It will be seen that there are two principal objects in view: First, to prevent so far as possible the further introduction of the San Jose scale and other injurious insects, etc., into the orchards of the State from infected nurseries located in other States; and, secondly, to eradicate or prevent the

further spread of these pests of the orchard, so far as possible, wherever they have already gained a foothold. Unfortunately, however, the law was not passed until the San Jose scale had become generally scattered over the State, as recent experience has demonstrated.

In order to prevent the further introduction of the scale into the State, all transportation companies are prohibited from delivering any consignment of uncertified stock originating in other States. Soon after the passage of this act, forty transportation companies doing business in this State were notified from this office, and with but very few exceptions, so far as has come to my knowledge, the law has been generally respected. These few exceptions have been more on account of negligence than a willful violation of the law. I am told that some of the Ohio River packet companies have frequently violated the law in this particular, but I have been unable to secure any positive proof to that effect.

In order to effectually accomplish the second purpose, the State Entomologist or his assistants are authorized to enter upon any premises where the San Jose scale or other dangerously injurious insects or plant diseases are believed to exist, and "any person or persons who shall obstruct or hinder said State Entomologist or his assistant in the discharge of their duties, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than ten nor more than twenty-five dollars." In case the owner of any infested stock does not apply the remedies prescribed by the State Entomologist within a specified time, he is thereby made liable to a fine of not more than twenty-five nor less than ten dollars. This last provision has proved very helpful in enabling us to enforce the law in several instances where the owners of trees were either obstinate or indifferent concerning the matter.

It will be noticed that Section 1 of this act provides that all nurseries of the State shall be inspected at least once each year, not earlier than June 1 nor later than October 1. The act also provides that whenever a nurseryman or seller of trees, shrubs, vines, plants or other nursery stock, who is a resident of this State, shall ship or deliver any such goods, he shall send on each package so shipped or delivered a written or printed certificate stating that such stock has been examined by a State or Government Entomologist and found, to the best of his knowledge and belief, to be free from San Jose scale or other destructively injurious insects or fungus enemies. By a general agreement entered into by a number of the State Entomologists of the Eastern and Middle States, a certificate of inspection signed by any one of said State Entomologists shall be valid in any other State requiring a similar inspection. It has recently developed, however, that the time limit for the inspection fixed by some States does not correspond with that of the other States; hence a meeting of all the State Entomologists east of the Rocky Mountains has been called for January 4 at Chicago, for the purpose of unifying the laws of the various States in this as well as some other respects, so as to make them more generally effectual in accomplishing the ends sought.

The following is a list of official nursery inspectors which has been furnished to Indiana nurserymen and dealers:

To Indiana Nurserymen:

Whenever any nursery stock and other horticultural products imported into this State bears a certificate of apparent freedom from dangerous insects and contagious plant diseases signed by one of the inspectors on the following list and dated not earlier than the July last preceding, sellers of stock so certified who hold for their own premises valid certificates from this office are hereby authorized to substitute the certificate of this office for certificates of inspectors or other States as named below:

- Alabama—F. S. Earle.
- California—Alexander Craw.
- Colorado—C. P. Gillette.
- Connecticut—W. E. Britton.
- Delaware—Wesley Webb.
- Florida—P. H. Rolfs, A. L. Quaintance.
- Georgia—W. N. Scott.
- Illinois—S. A. Forbes.
- Iowa—H. E. Summers.
- Kansas—Percy J. Parrott, E. A. Popenoe, J. S. Hunter.
- Kentucky—H. Garman.
- Maryland—W. G. Johnson, C. O. Townsend.
- Massachusetts—C. H. Fernald, H. T. Fernald.
- Michigan—D. W. Trine.
- Montana—I. D. O'Donnell, Robert A. Cooley, C. H. Campbell, W. H. Halran, J. H. Edwards.
- Nebraska—Lawrence Bruner.
- New Jersey—John B. Smith.
- New York—C. A. Wieting.
- North Carolina—Gerald McCarthy.
- Ohio—F. M. Webster.
- Oregon—Wilbur K. Newell, Lloyd T. Reynolds, J. R. Casey, Emile Schanno, Judd Geer.
- Pennsylvania—S. B. Helges, Frank M. Bartram, Geo. C. Butz.
- Tennessee—Chas. E. Chambliss.
- Utah—J. A. Wright, J. P. Sorensen, C. A. Hickenlooper.
- Vermont—F. A. Waugh.
- Virginia—William B. Alwood, J. L. Phillips.
- Washington—J. E. Baker.
- Wisconsin—W. A. Henry, E. S. Goff.

In case of misuse of certificate by changing, defacing or placing it on uninspected stock, the undersigned reserves the right to revoke any such certificate and to refuse thereafter to inspect the premises of the person or firm so doing.

JAMES TROOP,
State Entomologist.

NURSERIES INSPECTED DURING THE PAST YEAR.

The work of inspection for the year 1900 began June 1 with the same assistants as were employed in 1899, viz.: H. H. Swaim, of South Bend, and R. A. Simpson, of Vincennes, both of whom proved themselves to be well qualified for the duties assigned them. In July Mr. Simpson resigned and his brother, H. D. Simpson, was appointed in his place. Mr. H. M. Widney, of Dekalb County, was also appointed especially to look after the canker worm and black knot in that section of the State.

In September an outbreak of the San Jose scale was reported in some of the Ohio River counties, and as my regular assistants were employed elsewhere, I appointed Mr. C. E. Craig, of Otwell, Pike County, a former student of mine, to make an investigation, which he did in a very satisfactory manner.

For the purpose of convenience in making the inspection, the State was divided into three districts—the northern, central and southern—to each of which was assigned an inspector, including myself. In this manner we were able to accomplish the task in the required time. One hundred and sixty-one nurseries were inspected, in only two of which was found San Jose scale, and these had evidently come from infested orchards near by. The infested trees in these nurseries were dug up and burned, and the owners were ordered to fumigate all trees sold with hydro-cyanic acid gas, which would destroy any living scale insect which might have been overlooked in the burning. This work in one of the nurseries was done under the immediate supervision of one of my assistants, and the owner was required to sign the following statement before a certificate was granted him:

I,, do hereby agree and affirm that I will not sell or permit to be sold, before June 1, 1901, any nursery stock which has been grown on my premises, except that which has been fumigated under the direct supervision of the Assistant State Entomologist on or before October 23, 1900. It is further expressly understood that it is upon the above condition that I receive the State Entomologist's certificate of inspection, which expires June 1, 1901.

It was our opinion that after this thorough and heroic treatment there could be no possible danger resulting from the spread of the insect.

INFESTED ORCHARDS.

In 1899 I reported the San Jose scale as having been found in thirteen counties. During the past year, four more counties have been added to the list of those in which the scale has been found. The list now includes Laporte, Lagrange, Dekalb, Miami, Howard, Wayne, Morgan, Marion, Vigo, Jefferson, Clay, Vanderburgh, Perry, Clark, Washington, Franklin

and Gibson. The outbreaks in Laporte, Lagrange, Dekalb, Howard, Morgan and Franklin counties, however, were of a mild nature, and by applying thorough treatment to the trees, I am quite confident that these counties have been nearly or entirely freed from the scale. Further investigation, however, may show this to be a false conclusion. Last year it was thought that Marion County could be placed in the exemption list, but during the past summer trees in nearly twenty different city lots in the city of Indianapolis have been found to be seriously infested. Here seems to be a serious problem for the city authorities to solve, as the present appropriation for the use of the State Entomologist will not warrant him in undertaking the job alone, although much has already been done by destroying badly infested trees and giving advice as to how to treat the remainder.

Another seriously infested locality is the city of Evansville and the county immediately surrounding it. One of my assistants, Mr. C. E. Craig, was sent down to make investigations, and after spending about three weeks in that vicinity, he reported fifty-six different places more or less infested with the scale. Many trees were ordered destroyed and the proper remedy given for the balance, but to be successful in combating this pest in these badly infested districts will necessitate the employment of a competent man to give his entire time to the work for several months during the year, in addition to the regular nursery inspection work.

During the year there have been visited one hundred and thirty orchards, including the city lots mentioned above. These, with the 161 nurseries inspected, make a total of two hundred and ninety-one inspections for the year. The total cost of these inspections was \$711.37, of \$2.44 for each inspection. Perhaps a word of explanation is needed here. The last General Assembly appropriated \$1,000 annually for the expenses of this office, but according to the ruling of the Auditor of State, only \$583.31 of this amount was available for the first year. The expenses of the first year exceeded this amount \$288.62 which left for the present year only \$711.37, which amount was entirely exhausted before the work of the year, which should have been done, was completed. The State Entomologist of Illinois, in his report of the cost of similar inspection work done in that State during the past two years, states that he received \$9,292.25, and paid out \$9,080.05, or more than \$4,500 per year.

This expense was divided as follows:

Inspection of orchards.....	\$1,253 85
Inspection of nurseries.....	2,601 14
For destruction of San Jose scale.....	5,225 06

It will be seen that the cost of eradicating the scale, where it had already gained access to the orchards, was more than one-half the entire cost of inspection.

The fruit interests of Indiana are perhaps not so great as those of Illinois, but with the proper encouragement there is no reason why they should not become so. We may never be able to entirely eradicate the San Jose scale from all of our orchards, but I am confident that with an increase of \$1,000 in the annual appropriations for this work, we shall be able to largely check its further spread. I am glad to be able to state that the sentiment which exists among the fruit growers, in localities where the scale has been found, is very encouraging, and, with but few exceptions, the men who have been commissioned to execute the inspection law have been treated with the utmost courtesy, and have been given every opportunity by the owners of nurseries and orchards to perform their work thoroughly. There is no question but that the law is a good one, and that much good is resulting to the fruit interests of the State.

FINANCIAL STATEMENT FOR THE YEAR ENDING OCTOBER 31, 1900.

Receipts.

Amount received from State treasury..... \$1,000 00

Expenditures

Excess of expenditures for 1899.....	\$288 63
Traveling expenses, including hotel bills and livery hire	317 97
Postage, express, telegrams.....	19 30
Per diem of self and assistants.....	361 25
Stationery and printing.....	12 85

Total expenditures	\$1,000 00
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Respectfully submitted,

JAMES TROOP,

State Entomologist.

LIST OF INDIANA NURSERYMEN, INSPECTED IN 1900.

With name and postoffice address, together with amount of stock under cultivation.

J. TROOP, STATE ENTOMOLOGIST.

Albertson & Hobbs, Bridgeport, Marion County. Location, one-half mile west of Bridgeport. Two hundred acres in nursery stock.

H. W. Henry, Laporte, Laporte County. Location, one mile northwest of Laporte. Seventeen acres of sail fruit and three acres of fruit and ornamental trees.

- Wm. La Hane, Chesterton, Porter County. Location, suburbs of town. Five acres small fruits. Dealer.
- W. H. H. Smith, Medaryville, Pulaski County. Dealer.
- S. W. Kepler, Pulaski, Pulaski County. Location, five miles southwest of Pulaski. Two and one-half acres each of small fruits and tree fruits.
- W. B. Warfield, Pulaski, Pulaski County. Location, six miles southwest of Pulaski. One acre small fruits. Dealer.
- Joseph Korner, Star City, Pulaski County. Location, two and one-half miles west of town. Four acres small fruits. Dealer.
- A. C. McKinley, Francesville, Pulaski County. Location, western part of village. Dealer.
- Chas. Scott, Winamac, Pulaski County. Location, one and one-half miles southeast of village. One acre tree fruits and ornamentals.
- L. J. Noe, Winamac, Pulaski County. Location, one and one-half miles northwest of town. Eleven acres small fruits. Dealer.
- Hugh Rogers, Knox, Starke County. Location, one mile south. Fourteen acres small fruits. Dealer.
- H. M. Hand, Argos, Marshall County. Location, three miles northwest. Three acres small fruits. *
- T. J. Coffeen, South Bend, St. Joseph County. Location, three miles southeast. Twenty-one acres small fruits. Dealer.
- O. P. Bradley, South Bend, St. Joseph County. Location, three and one-half miles southeast. Twelve acres small fruits. Dealer.
- A. Y. Cathcart, Bristol, Elkhart County. Location, near town. Ten acres small fruits. Dealer.
- J. C. Grossman, Wolcottville, Lagrange County. Location, three miles northwest. Two acres small fruits. Dealer.
- John W. Holmes, Wallen, Allen County. Location, five miles southeast of Hometown, four miles northwest of Wallen. Two acres apples and pears. Dealer.
- C. M. Parks, Bourbon, Marshall County. Location, one-half mile south. Two acres apples and pears, ten acres small fruits. Dealer.
- Holland & Co., Plymouth, Marshall County. Location, two and one-half miles southwest. Eleven acres trees, one acre small fruits.
- Jesse Wickinger, Plymouth, Marshall County. Location, two miles south. Eight acres small fruits. Dealer.
- J. F. Melton, Amboy, Miami County. Location, in town. Two acres small fruits. Dealer.
- Henry Minnick, Converse, Miami County. Location, three and one-half miles northeast. Two and one-half acres apples, cherries and pears.
- John N. Trook, Converse, Miami County. Location, in town. Dealer and jobber.
- A. C. Preble, Marion, Grant County. Location, 212 South Adams Street. One acre in nursery stock. Dealer.
- F. M. Grant, La Fountain, Wabash County. Location, east side of town. One acre nursery stock. Dealer.

- W. W. Poole, Wabash, Wabash County. Location, six miles north of Wabash. Two acres of stock.
- B. Cook, Ijamsville, Wabash County. Location, one-half mile west. One acre small fruits. Dealer.
- G. N. Moyer, Laketon, Wabash County. Location, eastern part of village. Forty acres trees and small fruits.
- D. M. Garber, North Webster, Kosciusko County. Location, two miles south. Twenty-four acres small fruits. Dealer.
- Hurrow & Everetts, Butler, Dekalb County. Location, six and one-half miles north. Eight acres, mostly small fruits. Dealer.
- B. F. Mason, Red Key, Jay County. Location, in town. Fifteen acres small fruits and ten acres tree fruits two miles from town. Also ten acres of stock near Martinsville, Ind.
- J. B. Witwer, South Bend, St. Joseph County. Location, one mile east. One acre tree fruits and ornamentals.
- J. W. Snoke, South Bend, St. Joseph County. Location, in town. Dealer.
- Peter Kongen, South Bend, St. Joseph County. Location, four miles southwest. Dealer.
- Bremen Nursery Company, Bremen, Marshall County. Location, just outside of town. Eight acres fruit, shade and ornamentals and four acres small fruits.
- Jonas Stineman, Wawpecung, Miami County. Location, six miles east of Bennetts. Dealer.
- John I. Williams, Warren, Huntington County. Location, north side of town. Two acres fruit trees.
- G. W. Williams, Hartford City, Blackford County. Location of nursery, four and one-half miles south of Warren. Two acres fruit trees.
- T. J. Mercer, Dillman, Wells County. Location, seven miles south of Warren. Two acres of nursery stock.
- Wabash Valley Nursery Company (J. B. Evans), Bluffton, Wells County. Location, adjoining the town on west. Fifteen acres fruit trees.
- Geo. Harnish, Bluffton, Wells County. Location of nursery, five miles northwest. Resides in town. Three acres tree fruits and 65 acres in orchard all under five years.
- J. B. Alexander, Hartford City, Blackford County. Location, southwest part of city. Dealer.
- Geo. J. Hoagland, Portland, Jay County. Location, five miles north of Red Key. Seven acres small fruits. Dealer.
- E. Potter, Red Key, Jay County. Location, five and one-half miles north. Two acres small fruits.
- John Caylor, Ridgeville, Randolph County. Location, eastern limits of city. Eight acres tree fruits and shade trees.
- J. M. T. Wright Nursery Company, Portland, Jay County. Resides one mile west. Ten acres fruits and shade trees. Four acres small fruits.
- Warren C. Gregg, Pennville, Jay County. Location, one mile northwest. Eight acres trees and four acres small fruits.

- Geo. Paxson & Son, Pennville, Jay County. Location, three miles northwest. Two acres tree fruits, one-half acre small fruits.
- Jarrett & West, Montpelier, Blackford County. Location, two and one-half miles west. Six acres fruit and shade.
- T. J. Peffley, Dora, Wabash County. Twenty acres small fruits and sixty acres in orchard.
- Harry White, New Holland, Wabash County. Location, ten miles southeast of Wabash. Eight acres small fruits; florist and dealer.
- H. H. Swalm, South Bend, St. Joseph County. Location, three miles southwest. Six acres small fruits.
- Willard Fullhart & Co., Muncie, Delaware County. Location, four and one-half miles southeast. Eight acres in tree and four acres in small fruits.
- S. Hughe & Son, Anderson, Madison County. Location, one mile east. Seven acres in trees and five acres small fruits.
- M. L. Tuttle, Anderson, Madison County. Location of nursery, four miles north of La Pel. One acre.
- Wm. S. Wade, Perkinsville, Madison County. Location, four miles north of La Pel. One acre.
- The La Pel Nursery Company, La Pel, Madison County. Location of nursery, two miles north. Five acres trees, two acres small fruits.
- W. W. Phelps, Noblesville, Hamilton County. Location, two miles southeast. Two acres trees, ten acres small fruits.
- Chas. Wasson, Westfield, Hamilton County. Location, two miles east. One and one-half acres Carolina poplars, one acre small fruits.
- Mrs. Jane Sanders & Son, Westfield, Hamilton County. Location, one mile east. Two acres in trees.
- Carmel Nurseries (W. J. Ward), Carmel, Hamilton County. Residence, Carmel, nursery, two and one-half miles south. Five acres small fruits. Dealer.
- H. C. Weaver & Co., Shelbyville, Shelby County. Location, one and one-half miles southeast. Five acres trees, two acres small fruits.
- L. B. Cochran, Greensburg, Decatur County. Location, north side of town. Five acres trees, one and one-half acres small fruits.
- Geo. C. Young, Greensburg, Decatur County. Location, one mile southeast. One acre nursery, and one acre small fruits.
- Samuel Kelly, Alert, Decatur County. Location, north end of town. One acre.
- David M. Goss, Goss' Mills, Jackson County. Location, six miles south of Freetown. One acre.
- G. W. True, Lockman, Brown County. Location, seven miles north of Freetown. One acre.
- Samson David, Nashville, Brown County. Location, seven miles north of Freetown. One acre.
- The Fidelity Nursery (Phillips Brothers), Hobbleville, Greene County. Fourteen miles west of Bloomfield. Ten acres in tree fruits.

- Thos. J. Ward, St. Marys, Vigo County. Location, two and one-half miles northeast of St. Marys and six miles northwest of Terre Haute. Ten acres of nursery and twenty-five in orchard.
- Decatur Downing, Clinton, Vermillion County. Location of nursery, three miles northwest. Ten acres in nursery, eighty acres in orchard.
- Amos Ragle, Elnora, Daviess County. Location, south side of Elnora. Seven acres trees, four acres small fruits.
- H. R. Merrill, Brownstown, Jackson County. Location of nursery, a part two miles east of Freetown and a part northeast of Brownstown.
- Frank Milhouse & Son, Hyde, Jennings County. Location, five miles southeast of Butlerville and one and one-half miles east of Hyde. Twelve acres trees.
- Henry C. Semon, Bennville, Jennings County. Location, one and one-half miles east in Ripley County.
- Jesse G. Milhouse, Ezra, Jennings County. Location, four and one-half miles southeast of Butlerville. Three acres.
- Ben Knaub, North Vernon, Jennings County. Five and one-half miles northeast. One acre.
- C. C. Pennington, North Vernon, Jennings County. Location, south side of town. One acre nursery and small fruits.
- L. D. Pennington, Vernon, Jennings County. Location, one and one-half miles southwest. Two acres.
- Thos. H. Beavers, New Castle, Henry County. Location, three miles north. Four acres nursery stock and small fruits.
- W. E. Stacey, Lyons, Greene County. Location nursery, two miles north. Two acres nursery, one of small fruits.
- H. A. Burkhart & Son, Indianapolis, Marion County. Location, three miles south. Three acres nursery and fifteen acres small fruits.
- E. G. Hill & Co., florists, Richmond, Wayne County. Location, one-half mile east. Two acres in plants and twenty greenhouses.
- E. Y. Teas, Green Forks, Wayne County. Location, three miles northeast. One and one-half acres, mostly bulbs.
- W. H. Gear, East Germantown, Wayne County. Location, residence in town, nursery one and one-half miles southeast. Two acres in nursery and three in small fruits.
- Thos. B. Morris, Richmond, Wayne County. Location, one mile east. Four acres nursery and one-half acre small fruits.
- Mercer Browne, Spiceland, Henry County. Location, one mile south of Spiceland and one and one-half miles north of Dunreith. Ten acres in nursery and five in small fruits.
- Charles A. Merrick, Cambridge City, Wayne County. Location, northeast side of town. Small fruits only.
- John Bird & Son, Raysville, Henry County. Location, north side of town railroad station, Knightstown. Ten acres nursery.
- W. P. Bundy, Dunreith, Henry County. Location, one-fourth mile north. Eighteen acres nursery, two acres small fruits.

- W. H. Shields, Charlottesville, Hancock County. Location, north side of town. Two acres nursery, two acres small fruits.
- B. F. Stinger, Charlottesville, Hancock County. Location, residence in town; two acres small fruits one and one-half miles north. Strawberry plants only.
- D. H. Goble, Greenfield, Hancock County. Location, one and one-fourth miles west on National pike. Fifteen acres in small fruits, currants and berry plants.
- J. E. Shideler, Indianapolis, Marion County. Location, 550 West Forty-second Street. Seven acres small fruits.
- H. C. Eickhoff, Gallaudet, Marion County. Location, four miles southeast of Indianapolis. Four acres nursery, three acres small fruits.
- Ed. A. Eickhoff, Gallaudet, Marion County. Location, six miles southeast of Indianapolis. Two acres in nursery, five acres small fruits.
- J. K. Henby & Son, Greenfield, Hancock County. Location, one mile west. Thirty acres in nursery, fifteen acres small fruits.
- Hiram P. Dean, Marble Hill, Jefferson County. Location, adjoining town. Six acres in nursery.
- Reed Nursery Company, Harrell, Jefferson County. Location, two and one-half miles southeast of Harrell. Four acres of nursery.
- Chas. F. Graham, New Albany, Floyd County. Location, two and one-half miles northeast of city. Three acres in nursery.
- F. Waler & Co., New Albany, Floyd County. Location, two miles northeast. Five acres in nursery.
- Mrs. Elizabeth Vernia, New Albany, Floyd County. Location, three miles southwest of city. Four acres in nursery.
- J. K. Graham, New Albany, Floyd County. Location, lives in the city; nursery three miles north. Two acres in nursery.
- John J. Deitrich, Henzie, Clark County. Location, six miles northeast of Borden. One-fourth acre in nursery.
- Wm. N. Fordyce, Borden, Clark County. Location, two miles south of Borden. One acre in nursery.
- O. P. Fordyce, Salem, Washington County. Location, one-fourth mile south of town. Two acres in nursery.
- Jas. W. Heacock, Canton, Washington County. Location, one-fourth mile north of Canton. One-half acre in nursery.
- E. E. Heacock, Salem, Washington County. Location, four miles northwest of town. One-half acre in trees.
- H. G. Currey, Mitchell, Lawrence County. Location, resides in town; nursery five miles south. Two acres in trees.
- W. T. Terrell, Bloomfield, Greene County. Location, one-half mile north of town. Fifteen acres in trees and two acres small fruits.
- J. M. Bridges, Dugger, Greene County. Location, one mile east and two miles south of Bloomfield. Twelve acres in nursery.
- R. T. Patterson, Bloomfield, Greene County. Location one mile south of town. Two acres in trees and three acres in small fruits.

- C. E. Dixon, Bloomfield, Greene County. Location, one mile south of town. Six acres orchard and three acres small fruits.
- Sig. Rogers, Bloomfield, Greene County. Location, four miles east of town. Two acres trees, one acre raspberries.
- Sig Rogers, Bloomfield, Greene County. Location, two miles northwest of town. Two acres small fruits.
- W. C. Bennett, Scotland, Greene County. Location, four miles south of Koleen. Seventy acres in trees, two acres in small fruits.
- W. E. King, Scotland, Greene County. Location, five miles south of Koleen. Three acres nursery stock.
- Dickey & Garrett, Doans, Greene County. Location, near town. Six acres in nursery stock.
- Martindale & Hostetter, Doans, Greene County. Location, near town. Eleven acres in nursery stock.
- S. D. Bennett, Koleen, Greene County. Location, two and one-half miles southwest. One acre nursery and one acre small fruits.
- Meredith & Son, Koleen, Greene County. Location, two and one-half miles southeast. Eighteen acres in nursery stock; one acre small fruits.
- W. C. Reed, Vincennes, Knox County. Location four miles southeast. Fifty acres nursery stock; twenty-five acres small fruits.
- H. M. Simpson & Sons, Vincennes, Knox County. Location, two miles east. Fifty acres in nursery stock, twenty-five acres small fruits.
- W. M. Cockrum, Oakland City, Gibson County. Location, near town. One and three-fourths acres nursery stock.
- W. D. Bowen, Evansville, Vanderburgh County. Location, one and three-fourth miles southeast. Seven acres in nursery stock.
- L. Crosby, Washington, Daviess County. Location two miles southeast.
- W. E. McElldery, Booneville, Warrick County. Location, in town and one-half mile south. Five acres in nursery.
- Peter Broshears, Booneville, Warrick County. Location, one-half mile south. Small stock.
- E. T. Jeffries, Booneville, Warrick County. Location, five miles southwest. Small stock.
- John Heins, Jr. & Co., Lake, Spencer County. Location, two miles south. Three acres in stock.
- A. L. Hein, Chandler, Warrick County. Location, five miles west. Ten acres in nursery stock.
- Smith Hazen, Hatfield, Spencer County. Location, one mile south. Five acres in nursery stock.
- W. T. Smith, Grand View, Spencer County. Location, near town. Six miles from Rockport. Five acres.
- W. R. Polk, Tobinsport, Perry County. Location, one-half mile west. Ten acres in nursery.
- W. W. Winchel, Tobinsport, Perry County. Location, west of W. R. Polk. Small stock.

- John S. Burgess, Depauw, Harrison County. Location, three miles south. Ten acres.
- Peter W. Wolfe, Moberly, Harrison County. Location, one and three-fourth miles southeast. Three acres.
- Charles McClaren, Sunshine, Harrison County. Location, one-fourth mile southwest. Three acres.
- J. M. Alstott & Son, Sunshine, Harrison County. Location, one and one-half miles southeast. Four acres.
- Geo. W. McIntosh, Rego, Orange County. Location one-half mile southwest. Five acres.
- Montgomery & Ervin, Scottsburg, Scott County. Location, four miles southeast of Scottsburg. Five acres.
- H. D. Brubaker, Ridgeway, Howard County. Location, one and one-half miles from town. Small fruits and small stock of trees.
- James Ford, Princeton, Gibson County. Location, in city limits. Small stock.
- J. O. Ward, Huntington, Huntington County. Location, edge of city. Two acres of trees.
- F. B. LeSourd, Sleeth, Carroll County. Location, near town. Small fruits. Dealer.
- C. B. Moore, Sitka, White County. Location, five miles northeast of Monticello. Five acres small fruits.
- Wilber C. Stout, Monrovia, Morgan County. Location, six miles from town.
- Granville Cowing, Muncie, Delaware County. Location, three miles north. Small fruits.
- Lee Ripperdan, Valley City, Harrison County. Location, near town. Small stock.
- O. Engles, Walton, Cass County. Location, near town. Small fruits. Dealer.
- T. F. Craig, Otwell, Pike County. Location, near Velpen. Small stock.
- Walter Brown, Connersville, Fayette County. Location, near town. One-half acre catalpas.
- Randolph Bros., Lafayette, Tippecanoe County. Location, three miles southeast. Thirty acres.
- A. S. Bennett, Lafayette, Tippecanoe County. Location, near city limits. southeast. Ten acres.
- O. A. J. Morrison, Middlefork, Clinton County. Location, six miles south of Michigantown. Carolina poplars.
- Snoddy Nursery Co., Lafayette, Tippecanoe County. Location, one mile west. Five acres. Dealers.
- J. F. Dreyer, Frankfort, Clinton County. Location, in suburbs. Two acres, mostly small fruits.
- Ran Beuoy, Matthews, Grant County. Location, one mile west. One acre small fruits.
- J. M. Wilson, North Judson, Starke County. Location, near town. Small fruits.

REPORT OF DELEGATE TO MISSOURI HORTICULTURAL
SOCIETY.

W. C. REED, VINCENNES, IND.

We left St. Louis December 3d, over the St. Louis, Iron Mountain & Southern Railroad, following the Mississippi River for quite a distance. After leaving the river, the road begins to ascend the Ozarks. Judging from appearances and what we could see from the train, the country is very sparsely settled. In fact the land is too rough and rocky for cultivation. It is mostly covered with a second growth of white oak, red cedar and scrub oak, with some very large sycamore and elm along the streams in the valleys.

There seems to be some good land along the creek bottoms, but only in small patches.

The same kind of scenery continues until we reach Bismarck, seventy-five miles south of St. Louis. Here we changed cars and took the Belmont branch for Dellassus, twelve miles distant. Arriving at Dellassus, we were met by hackmen, who drove us two and one-half miles to Farmington, the county seat of St. Francis County.

Imagine our surprise on arriving at Farmington to find nice rolling land, mostly in cultivation, and land that grows crops equal to most of our Indiana farms. This land, I am told, is worth \$100 per acre, the mineral underneath being the reason the land is so valuable, as this is the greatest lead and zinc producing county in Missouri.

Farmington is a very thrifty town of 3,000 inhabitants, good buildings and a great many new houses in course of construction.

On reaching Farmington we went direct to the opera house, where the Missouri Horticultural Society was in session.

Here we found quite a good attendance for the morning session. The opera house was artistically decorated with bunting, flags and flowers. Also a display of all the mineral products of the county, which attracted considerable attention. And last, but not least, the fruit display, which was very large, principally of apples. The specimens were very fair, but some showed the effects of that dreaded scourge, the bitter rot.

The assortment of varieties was not as large as we usually have at our own State meetings. Ben Davis, Gano, Jonathan, Huntsman, York Imperial and Ingram being the leaders. Grimes' Golden and Winesap are grown some, but are recommended only for strong land, and principally on the lower ground or bottom lands.

The pear seems to be neglected somewhat, although I was told pears do exceedingly well around Farmington, having been planted there by

the early French settlers. The soil is a red clay, with plenty of iron—just what the pear needs.

Mr. A. T. Nelson's paper on "Packing and Marketing," was very instructive. Mr. Nelson and son have had large experience in this line, having packed seventeen thousand barrels of apples this fall, fifteen thousand of which are now in cold storage. He urges fruit growers to pack their fruit honestly, nothing but strictly first-class stock, and put in cold storage for the late market. It will always pay.

The night meetings were devoted mostly to literary and musical selections by home talent, of which there seems to be a good supply, as there are two colleges and one ladies' seminary there.

Dr. Wm. Trelease, of Missouri Botanical Garden, St. Louis, gave a very instructive lecture on "Edible and Poisonous Mushrooms and Toad-Stools," with lantern illustrations. Thursday morning the Pan-American exhibit came up for discussion. Their arrangements are mostly completed, having 200 barrels of select apples in cold storage, and space secured, the society not yet having received an appropriation to carry out the work. Mr. Nelson, their treasurer, who is also a commissioner to the Pan-American, has spent \$1,000 of his own money making preparations for the exhibit, trusting that the State will repay him. Indiana needs some of this push and enterprise or we will fall behind. They are also making arrangements for St. Louis in 1903.

Professor Stinson's paper on "Spraying," gave the results of experiments to control the bitter rot. In a plat that was not sprayed they picked two bushels of good apples and one hundred and forty bushels affected with bitter rot and entirely worthless. Plots sprayed two, three and four times showed benefits in proportion to the number of sprayings. The best results, however, were from five applications. The plot gave 99½ bushels of good apples and 67½ bushels of affected fruit. This was salable, however, and brought enough to pay all expenses of the five sprayings. Huntsman, which seems to suffer worse than some other varieties, where sprayed five times, gave 80 per cent. of first-class fruit; where not sprayed, 20 per cent. first-class. He used the Bordeaux mixture of ordinary strength and made the last spraying about August 1st. The fruit showed no bad effects from the late spraying. The dust sprayers seemed to attract considerable attention, and were well spoken of by several who had tested them, as they can be used at times when it would be impossible to get in the orchard with a liquid spray, when the ground is soft.

Professor Steadman's lecture, with lantern illustration, of "An Entomological Trip Through Old Mexico," was very instructive and interesting.

Professor Van Schrenk, of the Missouri Botanical Gardens, gave his experience with experiments in root rot, showing several specimens of trees that had died with the same. The specimens showed the growth of the fungus very plain. Apple trees planted where others had died with

the disease invariably succumb to its ravages in a short time, but pear planted in the same holes were not affected. The root rot is doing great damage in southwestern Missouri, in some cases having destroyed an entire forty-acre orchard. For further information he referred us to Bulletin No. 33 of the Arizona Experiment Station, where it has been thoroughly tested.

Mr. G. P. Turner read a paper on "Pruning and Planting" that brought out considerable discussion. I find that the most successful orchards are those that were planted shallow. In fact, some were planted on top of the ground and dirt banked up to them. These orchards have given the very best of results. This method I think would be worth trying, at least, especially in low ground, as it would give better drainage.

W. R. Wilkerson gave his experience with cropping an orchard, his principal crop being hogs, and then growing a succession of forage crops for them. He has quite a large orchard and divides it into smaller fields, sowing an early variety of barley, then cow peas, early and late, these being pastured off as fast as they are ready. He also uses red clover, but never leaves it more than one season, as he believes in cultivating as often as possible, not so much early, but later in the season, to mature the fruit crop and hold the foliage late. Spraying does not seem to have the attention it deserves. In Missouri the majority of the orchards are comparatively young and the country new as compared with some of the older States. They have not been bothered with scab and codling moth as much as we have. However, with bitter rot and other diseases increasing, the up-to-date fruit grower will be compelled to spray to keep the balance on the right side of the ledger.

The meeting adjourned at 10 p. m., December 5th, and we left at 2:30 a. m. for St. Louis, although some twenty-five or thirty stayed over to take a trip out to the mines the next morning. Arriving in St. Louis at 7:30 a. m., we started for home.

REPORTS OF COUNTY HORTICULTURAL SOCIETIES.

REPORT OF LAGRANGE COUNTY AGRICULTURAL AND HORTICULTURAL SOCIETY.

To Indiana Horticultural Society:

It is with much pleasure that the Lagrange County Agricultural and Horticultural Society sends its first annual greeting.

On December 30, 1899, in response to a call made by J. C. Grossman, a half dozen persons met at the courthouse in Lagrange and effected a partial organization by electing J. C. Grossman, President; Mrs. Lizzie Royer, Secretary, and Charles Lowth, Treasurer. Nine persons subscribed

their names to the membership roll and J. C. Grossman was appointed delegate to the annual meeting and to the State Board of Agriculture.

March 14, 1900, another meeting was held in the courthouse and a program carried out, after which a complete organization was effected, with the following persons as officers: President, J. C. Grossman, Wolcottville; Vice-President, J. J. Davidson, Lima; Secretary, Mrs. Lizzie Royer, Valentine; Executive Committee, Benjamin Ruhl, Lima, Mrs. J. W. Miller, Lagrange, John Green, Valentine.

Meetings were held May 5, June 20, August 15 and October 2, all with increased interest.

August 23 some twenty-five of the members, in company with a large number of the Noble County Society members, with the addition of President Hobbs and Secretary Troop, went on an excursion to Benton Harbor and visited Mr. R. Morrill's famous peach orchard. This proved the best object lesson that we had ever experienced and the benefits will be lasting.

Saturday, December 15, the first annual meeting of the Society was held at the pleasant farm home of Mr. and Mrs. J. W. Mills. Over sixty enthusiastic and happy people attended this meeting, and partook of the bountiful repast furnished by the ladies. Several good papers were read and ably discussed.

The Society at the close of the year had a membership of forty-nine, with twenty members in the State Society. The following officers were elected for the ensuing year: President, J. C. Grossman, Wolcottville; Vice-President, J. W. Mills, Lagrange; Secretary, Mrs. Lizzie Royer, Valentine; Treasurer, Chas. Lowth, Lagrange; Executive Committee, J. J. Gillette, Lagrange; R. H. Newman, Lagrange; A. J. Sigley, Woodruff. Program Committee, Riley C. Case, Lagrange; Mrs. J. W. Mills, Lagrange; Mrs. R. H. Newman, Lagrange; J. J. Gillette. Delegate to State Board of Agriculture, J. C. Grossman.

REPORT OF NOBLE COUNTY HORTICULTURAL SOCIETY.

Prof. James Troop, Secretary Indiana Horticultural Society:

Dear Sir—The Noble County Horticultural Society during the past year, beginning December, 1899, and ending December, 1900, enrolled on its list forty-six paid members; total number of members, 100. It held six regular meetings during the year. One of these was held at Albion, one at Rome City and four at the homes of members. Two called meetings of officers and working members were held.

It has sent delegates to State Horticultural meetings at Indianapolis and Plainfield. Also delegate to State Board of Agriculture meeting at Indianapolis, and gave its members an outing, going to the famous peach farm of Mr. Morrill, near Benton Harbor, Michigan.

The following officers were elected at the December meeting for the year 1901: J. C. Kimmell, President; Levi W. Harvey, Vice-President; J. W. Moorhouse, Secretary; George Feebles, Treasurer; Executive Committee, Don K. Hitchcock, Rev. Wm. Talbert, W. W. Carey.

Receipts.

1899, December—	
Cash balance on hand.....	\$78 77
1900—	
On account of dues.....	23 00
For advertising.....	80 00
Premiums, State Fair.....	23 00
Miscellaneous	4 76
	<hr/>
Total	\$209 53

Expenditures.

1900—	
Delegate State Agricultural meeting.....	\$10 00
Delegate State Horticultural meeting.....	10 00
Printing premium list.....	76 50
Other printing	6 25
Committee State Fair exhibit.....	33 76
Wagon hire at Benton Harbor.....	40 00
Premiums	22 30
Miscellaneous	9 28
	<hr/>
Total	\$208 00
	<hr/>
Balance on hand.....	\$1 44

A full report of proceedings will be published in Society premium list for 1901 and a copy mailed you as soon as published.

The apple crop was light. Late apples were mostly blown off during the great wind storm.

Only a few varieties of pears bore fruit. Peaches, cherries and plums were a failure. Small fruits a good yield.

This Society has during the past year perfected plans for a co-operative apple orchard within the county, and will make the sale of trees and planting of apple orchards its leading work during the coming year.

JOHN W. MOORHOUSE,
Secretary.

REPORT OF MADISON COUNTY HORTICULTURAL SOCIETY.

To Prof. James Troop, Secretary Indiana Horticultural Society:

Dear Sir—Since your last report contained no mention of the Madison County Horticultural Society, or the work it is doing, we beg leave to say that we are not only alive, but in a flourishing condition.

Meetings are held on the third Wednesday of each month. All are well attended, there seldom being fewer than fifty persons present in the worst weather, and in the summer time the attendance reaches three and four times that many.

We are a Horticultural Society in name, yet, this section having large live stock and agricultural interests, papers on these subjects have been found both interesting and profitable. Papers on social and economic questions have sometimes been found very instructive. Our motto might be "The greatest good to the greatest number." Although the members of the Society are nearly all horticulturists, agriculturists or stock men, we scarcely ever hold a meeting at which there are not professional and business men and their families with us.

They seem to find that which interests them in our meetings, and we enjoy having them with us. In this way the old barrier that was supposed to exist between the city bred man and his country cousin has here been destroyed and forgotten. Our Society is often entertained in the best homes in our county seat.

Perhaps no one subject that has come before the Society during the year has elicited more interest or, so far, been more instructive than a series of four papers (two of which have been delivered on "Forestry," by Joshua Tussell, of Markleville.

Yours truly,

W. CLIFFORD WOOD,
Chairman.

REPORT OF THE MONROE COUNTY HORTICULTURAL AND AGRICULTURAL SOCIETY.

Our Society has had a very pleasant and profitable year, although none of our members have had a bountiful fruit harvest. Strawberries and raspberries were about half a crop; blackberries were almost an entire failure; cherries were a full crop; plums half crop. There were but few peaches, and they were of inferior quality. Grapes rotted badly and were not more than half a crop.

There were but few orchards that had anything like a full crop of apples, and a great many of them were only fit for hog feed. The fall and early winter apples are about all gone, and what are usually late keepers are going very fast.

Apples were badly stung by the curculio, and spraying seemed to have little effect.

We hold our meetings the second Wednesday of every month, except January and February. Our annual meeting for the reports and election of officers is in March.

The officers the past year were Ben Kirby, President; J. T. Eller, Vice-President; Geo. P. Campbell, Secretary; J. S. Dinsmore, Treasurer; Fred Fess, R. H. Chamberlain and A. G. Howe, Trustees.

We held a fair on the day of our September meeting, competition being limited to the members. The display was very good, considering our poor fruit crop. Premiums were offered on all farm and garden crops, as well as table luxuries.

We also hold our annual strawberry show at our June meeting.

We have twenty-five active members and about \$80 in the treasury.

REPORT OF ST. JOSEPH COUNTY HORTICULTURAL SOCIETY.

Prof. James Troop, Secretary State Horticultural Society:

Dear Sir—The St. Joseph County Horticultural Society has enjoyed a very pleasant and profitable year. We offer premiums on fruit exhibited at our meetings from April to November, inclusive. Our receipts for the year show a gain of \$21.07 over 1899.

We have a membership of about eighty, and expect to aid the fruit growers of Laporte County during the meeting next summer.

The following are the officers for the year 1901: President, Geo. F. Newton; Vice-President, J. W. Kring; Secretary, H. W. Newman; Treasurer, C. P. Bradley; Program Officer, Mrs. B. A. Caldwell. All of South Bend.

Respectfully,

H. W. NEWMAN,

Secretary St. Joseph County Horticultural Society.

REPORT OF THE WAYNE COUNTY AGRICULTURAL AND HORTICULTURAL SOCIETY OF RICHMOND, IND.

To the Indiana Horticultural Society:

In submitting this my annual report of the Wayne County Agricultural and Horticultural Society for your consideration, we can not but be zealous in stating that this Society has been in continued existence about the longest, and is one of the oldest organizations of its kind in the State, and that it furnished its share of charter members to the State Society.

Our Society holds twelve sessions annually, either in the Society's room at the county courthouse or by invitation at the residences of some of our members and friends. Those held during the summer months are of this class, and are usually all-day gatherings. Well-filled baskets are taken, and at the noon hour a sumptuous picnic dinner is spread, where the ladies pleasingly vie with one another in the arrangement of such delicacies as many of our wives and daughters are favorably known to make.

The products of the farm, orchard and garden are placed on our tables at the different meetings during the year, as an evidence of success or failure in any particular line. This is found to be an excellent guide to others following similar pursuits. Such varieties can be more closely examined and known as best withstanding the continuous rains, the prolonged drouths, the excessive heat or the severe cold. Such samples as possess good shipping qualities, are fine keepers, excellent for culinary purposes, and those that can be successfully and practically grown.

With over a hundred members and their families, much interest is manifested, and considerable good is believed to be accomplished.

The annual election of officers occurs in December.

Officers for 1900: President, Hon. J. C. Stevens; Vice-President, M. B. Test; Recording Secretary, Walter S. Ratliff; Treasurer, Jehu P. Norris; Corresponding Secretary, Hon. Joseph C. Ratliff; Executive Committee, Hon. J. C. Stevens ex-officio, James Smith, Kate Ayler, Kate Scott, Nathan F. Garwood, Hannah C. Grave, Lizzie A. Moore and David Sutton.

As the members represent a diversified character of labor, effort is made to select essayists for the several sessions that will treat of such subjects as will particularly interest all at some time during the year. We have papers on "The Rose," "The Girl of the Farm," "The Farmer of Europe," "History of Agriculture," "The Fruit Grower," "Our Country Schools," "Neighbor With Your Plants," etc.

Within recent years, our organization unites with the Richmond Fair and Trotting Association to give an annual public fair, which was held September 25 to 29, east of the city. The attendance was good, but inclement weather prevented many from going on Richmond day. Our Society had exclusive charge of the exhibits of seeds, grains, vegetables, fruits, flowers and culinary articles.

The Farmers' Institute that is annually held in our county, although not under our auspices, is ably assisted by our corps of members.

At the February meeting the annual dinner is held. A premium list is offered for the best viands that can be produced by our lady members, consisting of turkey, chicken, cakes, pies, bread, salads, butter, etc. After the awards are announced, the premium articles are placed on banquet tables, in an adjoining room, that are already loaded with eatables, and hundreds partake of the bountiful repast. There is doubtless nothing done during the year that so unites a good feeling among the members and assists so well in increasing the membership of the Society.

FRUITS.

It is to the credit of the farmer and gardener that there is gradually more promiscuous tree planting of the fruit-bearing sorts. The gradual and inevitable destruction of our forests is dawning, and its influence on the future fruit industry is awaited with alarm. Forest and shade trees

must be replaced where possible, new areas covered and better care taken of our present growing trees.

Apple.—The trees suffered severely in some localities from the severe cold of last winter. A profusion of bloom was seen everywhere, followed by a fair setting of young fruit, indicating a good crop. Summer apples were good, many varieties yielding well. The fall supply was shortened by the drouth, and prolonged period of hot weather. Too much fruit fell prematurely, requiring early marketing, while the supply of winter apples was but about 20 per cent. of an average yield. Fruit rotted on the trees and in cellars. The ravages of insect enemies were common everywhere. The scab and rust almost ruined many varieties that are usually clear of such attacks.

The San Jose scale has been found on the apple and plum trees in this county, and is feared to be the coming scourge of the country.

Pears.—A goodly number of the summer varieties were well laden and of good quality. The fall sorts did not mature so well, falling badly, mostly prematurely. Of the winter kinds, the Keiffer claims its share of attention, and is being more universally planted since the public has learned how to properly ripen its fruit. The varieties receiving the greatest favor in this locality are the Sheldon, Tyson, Anjou, Bartlett, Flemish Beauty, Clapp's Favorite, Sugar and Buffum.

The dreaded pear-tree blight has lessened the number of our older trees, but a surplus number is generally planted to counteract the loss from this disease.

Plum.—From the persistent attacks of the black knot on the plum trees, followed by the usual fatality to the tree, especially in cases where the tree is neglected, has resulted in plum culture gradually passing into disfavor. It is claimed by some enthusiasts that some varieties are much less liable to its ravages and that it can be held in check by the application of chemical compositions, but most persons are more or less skeptical regarding its treatment. Nurserymen are now engaged in growing seedling nursery stocks, with the hope of furnishing a tree that will meet the popular demand.

The advent of the sprayer has been a great boon to the culture of the plum and other small fruits, and it is hoped that it may be used more uniformly and systematically.

Peach.—The present peach-crop was almost a failure in this section, although many protected trees in or near the city bore abundantly, with fruit of fair size and quality.

The bulk of our peach trees are usually found in our dooryards, although a few orchards exist among the possessions of some of our members.

Though strange, yet it is true, the general public is not partial to any particular variety, just so it is a freestone, of good size, rich color and of fine flavor.

Cherry.—The crop of this common fruit is generally fair, although an occasional season is seen when the trees are abundantly laden everywhere. The causes of such variations are usually attributed to climatic conditions, but the proportionate yield of fruit to the number and activity of curculio and other insects can not be overlooked. The earlier blooming varieties apparently suffer most from their ravages. For this reason, the cultivation of the Governor Wood has been almost entirely abandoned.

The late Morelloes and the Montmorency sorts are being extensively planted. No new seedling cherry at present claims the attention of the fruit-grower in this section.

Quince.—The severe weather ruined the bulk of our older bushes, many being entirely killed to the surface of the ground. This was particularly noticeable with those trees that were exposed to the west and northwest winds. The demand for quince fruit far exceeds the supply, largely due to the crop's uncertainty and the increasing popularity of the culinary dish known as "quince honey," which is made from the pulp of the quince apple.

Grape.—The keeper of the vineyard neglected his duty! The rewards of his labors are lessened and he is disheartened! Why is this? The severe winter killed back the vines, and together with the ravages of grape insects reduced the crop 50 per cent. Lovers of fine, compact bunches of luscious grapes eat them now with some hesitancy, being fearful of eating the larvae of the grape-berry moth, a scourge that has but recently become so prevalent throughout eastern Indiana.

Amateur grape growers are apparently confining themselves to a few of the standard and better tested varieties, realizing that the later novelties doubtless do not possess sufficient merit and hardiness to diversify the grower's attention.

Strawberry.—The supply was insufficient to meet the demand, although the number of strawberry growers remains about the same.

Other Small Fruits.—The cultivation of the other small fruits is not done so extensively by single individuals, but by the public generally, who usually assign a portion of their garden spot to their cultivation.

The blackberry, although a fruit whose crop is rather uncertain, maintains its place in the culinary department in its season. Many persons use it and the dewberry in preference for pies and jams.

The black-cap raspberry is more generally sought and is considered better in many respects than the red varieties, although the latter are much in demand for table desserts and jellies.

The currant and gooseberry yields very largely according to the number of larvae eating the leaves of the bushes, as the plants are often defoliated before the grower is aware of it.

Ornithology.—The recent interest taken in our public schools and elsewhere in the study of our native birds and bird life will no doubt, eventually, result in incalculable benefit to the fruit-growing industry of our

country. Their habits, their nesting, their economic value and their migratory movements are better understood, and the pupils will thus early in life become better acquainted with our native fauna, and be better enabled to distinguish the beneficial from the nonbeneficial species. They can not but see the value of necessary protection, knowing that it fosters the development of agricultural and horticultural pursuits.

Under one of the divisions of the United States Department of Agriculture considerable effort has been made in the study of ornithology. Individual birds, almost without number, have been officially examined, dissected and arranged in tabulated groups, until the fundamental classification is well-nigh complete. The contents of the crop and stomach display unmistakably the quality and character of the food consumed by the living bird, and assists largely in determining the character and habitat of the different species.

WALTER S. RATLIFF,
Secretary.

NEIGHBOR WITH YOUR PLANTS.

[Read before the Wayne County Agricultural and Horticultural Society.]

ISHAM SEDGWICK.

It was years ago the query was propounded, "Who is my neighbor?" That same little question has been the theme of many sermons. In a manner it is my text now. Some thirty years ago I wrote a thesis in which I held the theory that there was a spirit intelligence in every individual, no matter what its kingdom. Some of my good friends, who had the authority to criticise that thesis, said that it was a fine piece of imagination, but was inconsistent. After it was returned to me I read it again and criticized it myself and tried long and hard to find wherein it was inconsistent. It finally dawned on me that it was inconsistent with the critic's peculiar religious opinions. Now it may be that you will find in this some points that you may on the same grounds regard inconsistent. If so, just ponder over it awhile and see where the view comes from.

To neighbor with your plants means more than you are likely to imagine at first thought. I know that many of you religiously use the plow and the hoe, and you scatter out the manure that has accumulated around the barn as much perhaps to get rid of it there as with the idea that you are really doing a kindness to the field. And there are some old fellows here that in the earlier days of labor were glad to see the last shovelful loaded on the wagon and drawn to the field, for it meant to

them that there was no more labor of that kind till the next year. I remember when I first moved to the rich farm, then largely a swamp, that after I had put out all the manure of two or three years' accumulation on fields that my neighbors thought already rich, one of them said, "Don't you want to clean up my lot, too?" and was exceedingly astonished to see me with the wagon at that pile as soon as I could drive there. He never told me to get his pile again after he saw the crops I raised.

But I did not take this theme in order to provoke a series of old tales. I come to it with really serious intentions. I assert as a starting point that there is really a spirit intelligence in every plant that grows, and further assert that it is possible to get in touch with that spirit.

This is not the time to read a special dissertation to prove that assertion. You will, however, expect that facts may be cited in order that you may not be thought visionary because you attempt to neighbor with your plants. Note this one. When first the plow stirred the soil around a large poplar that stood near West River head it touched a large root close to the tree, and each succeeding furrow touched that root until it had traced the root more than 150 feet to where it spread out for feed in a moist piece of rich earth moistened by a spring. On what other theory can you base the action of that tree save that in its spirit intelligence it directed the deposit of the particles that built that root. By some method it discovered the supply of food and sent out for it by the best means at its command.

Every plant will do that same thing, because it has the intelligence to direct powers to that end. You may say that this is simply the selfish action of the plant. Certainly it is the action of the plant to fulfill its destiny and to reproduce its kind. All plants do that, and many of them do much more. It is these that do more than command attention. Why do they do it? If every man could answer his own questions I should perhaps give you an undisputed answer to this. There is no doubt a satisfactory answer, and one that is at least partly satisfactory is that it is an attempt to do justice to its neighbor. It is an effort to be responsive to the calls of its neighbors. Is it not a beautiful theory that plants are responsive in their efforts to repay the kindness coming to them?

It has been said that the plant shall produce seed after its own kind. It is true that they do it, and it is equally true that they do more. Were it not there would be no development to better things. The common crab-apple or the common red haw produce seed after their kind. From these and some kindred species not common here have been produced all those fine varieties that to-day go so far to make up the table delicacies of our kind.

How has this been done? Do you know? Oh! You will say that it has been done by cultivation? Has it? How? Which of you can take a crab-apple seed and produce more than a crab? Which of you can take a wild rose and from it grow an American Beauty? Which of you can

take the little tuber of Peru and produce a large table potato? It can be done, and it has been done. Will you tell me how? There are many nations on this earth. They speak in many strange tongues. If one of you were suddenly dropped down in one of these strange tribes you might not be able to communicate. You would likely be misunderstood more than understood. Yet you were only dropped in another tribe of your own kind. You should therefore expect it to be still more difficult to understand or communicate with other species.

You have made pretty fair progress with some other species. You often find that you can nearly talk to your dog understandingly. You have been able to teach him some of your language and some of your habits and have come on terms of good fellowship with him. You have made him your neighbor.

You, as the supposed superior being, have been able possibly to teach him more than he has been able to teach you.

The analogy will hold good as to plants. Each plant has its grade of capacity. What matter if some of them seem so limited? The germ of mind is still there and it may answer in its way. It will respond to the neighbor spirit. Many have responded to the higher thought of man.

I have read a little story of a bishop that stood high in the great Catholic Church and in his zeal for the cause of his church and religion found himself far off in the grand Himalayan Mountains. He was there taken in charge by some of the master Hindoo magi and initiated in their mysteries. He was there taught that wondrous story of the auras. Taught that each particle of matter of whatever kind had its aura or sphere of influence and its own peculiar kind of influence, and that each aura was subject to the influence of all those in or touching the aura of others. It is a beautiful idea, teaching as it does the brotherhood of all things.

But it is not necessary to go to the far India to learn the same very beautiful lessons. Our gardens and our fields are as surely possessed of the auras or spirits of the plants in them as are those of any lands.

What I mean by all these drifting thoughts is that it is possible for you in a manner at least to neighbor with your plants. Inasmuch as it has been taught that to neighbor is to love and make that love known, we can now get more directly to the subject.

It is desirable to get in touch with your plants. Every one of you can find some one of your human neighbors who has phenomenal success with some certain plants. One can grow fine roses and another fine cabbages.

One can grow beautiful apples and another grand potatoes. And some of you can so teach others and instill in them the art till they can grow the same plants that succeed so well with you.

Your horticultural papers teem with lucid dissertations on how to select the soil, how to fertilize, how to plant, and how to cultivate, and

how to prune, and yet, after you have done all this, there is some subtle power or way about some one of those who follow exactly the same instructions and that power or way produces a better result than others.

And the same one may take two seeds and give them equal care so far as in their power lies and yet there will be a great difference in the results. The two seeds having the same parentage refuse to produce the same results.

Ah, but did you treat the plants the same? When in your culture did you hold the same good thought and wish while tilling one that you did in your service to the other. With knife in hand you may stand at one young tree and cut off a limb here and another there, watching that you leave a bud here and another there so as to direct the plant in its growth, and then you stand by another and find that it has had a different idea in its growth and find that idea was at variance with your idea, and you begin with a different tone toward that tree, and you cut with a little more energy or a different spirit, and mayhap with some resentment that it did not do better, and that tree has not had the affection and love that you gave the other, and it does not respond with the same effort that is given by the first.

I assure you that there is more in this than you may at first think.

I know a case in which the longing and constant wishes of a lady who gave close and careful attention to a slip cut from a single pink oleander was rewarded by that tree in its giving double and white flowers. That was regarded by the florist as a sport. Yet that sport was perpetuated.

A gentleman cultivating a beautiful rose often admired it and yet at the same time wished that he could only add to it the golden glow of the sunset, and that plant sent out a sport that had the red of the sunset mingled in the shading of its petals. He was a neighbor with the rose and it responded, and the lady was neighboring with the oleander and it responded to her wish.

Men have sat by their plants hybridizing and cross-fertilizing and all the time with intense thought of the kind of flower wanted and have had their fondest hopes realized. Because the result has not always been good is not an argument against the theory, for none of you can know the thoughts or ideas of the different workers or which of them came in touch with the spirit of his plants. Some of you will smile at this theory, and I have no means of knowing that you may not even consider it a dream, yet there is in it a reality and a beauty as charming as the roses that has responded to the love of their neighbors.

I shall not make this a long paper for the reason that it is better to have one beautiful and true thought deeply planted in the hearts of my hearers than it is to tire them by a repetition.

The lesson that I would have you learn is not that you always, when planting your seed, have in mind the dollars and cents that the crop

will bring. I want you to come into close communion with the plants under your care. I want you to love them so that it is a pleasure and not a task to labor with them. That you bring them the fertilizing feed with the same pleasure that you take their luscious fruits to your own table. There is joy in your labors when it is well understood that your plant is waiting with joy for your coming and responds with pleasure to your desires. Is it not a beautiful thought that your ideal of the fruit that is to grow may be seen by the spirit of the tree and followed by its efforts to so place the atoms of the food that you have given in the form you have also presented?

We have ideals of fruits, but there are only few of us who have a different or better ideal than we have seen produced. Not many of us have ever with loving hands planted the apple-seed and cared for the tree with the spirit of love always present and at the same time with the ideal apple in our mind and faith that we could thereby add to the beauty or goodness of the product of that tree. This idea may and possibly is sometimes carried out. Fortunately it more often happens that an approach to the ideal conditions comes with the eating of a luscious apple, and under its inspiration the seed of it is planted.

It requires more than the life of one of our species to produce really grand results. It is a good thing that there have been grand men and women scattered through the ages of the past and that each of them in their day and time have been neighbor to their plants. The cumulative effect of this is seen to-day in the great progress that has been made in all lines. Some of our horticulturists have recently wrought wonders in the apparent improvements made in plants and fruits and flowers. They are now neighbors to the plants that have been nurtured and loved in the past.

These have learned something of the love of mankind and have to the extent of their ability responded to his wants. These cultured ones are more moved to respond now to the one who neighbors with them than were their ancestry that had to battle for their lives. Don't think but what these battles have been for the good of all. There is not a weed but has done its share toward the building of the earth. There has been an inspiration in and behind the efforts of all living things, and each has had its place and its power, and the records of its work occupy some little corner in the records of creation. We may not see the harmony of all this, but it is in the plan of development. Surely these are the best days and the best of all the earth is now here. It is time to cultivate the spirit of communion with the individualities of all things that surround us and to us, who love the fruits and flowers, it is time to neighbor with our plants.

Let us bear testimony and pay tribute to that odd little people away over in Japan that have wrought some wonders in the plant world. They made gods of their plants and worshiped them. Possibly it was

thus that they came so closely in touch with the spirits of the plants that their wishes were intelligibly presented to the plants and, in the long years of such love and worship there was a communion of spirits that led to the production of such wonderfully good things praised by all peoples.

No doubt we have more to learn than we have learned. We may venerate the wisdom of our fathers and praise the Father of all spirits that his greatest creation, the spirit of love, is not confined to the spirits of men, but has a home in the hearts of the plants as well. A broader view may lead us to neighbor with our plants. It may lead us to yet higher ideals and give us the power to impress the highest ideals on the spirits of our plants. The poetry of the universe runs in the rhythm of love and its lines lead in harmony to the spirits of all life. Is it not a sweet poetic dream that you can and do neighbor with your plants?

PURDUE UNIVERSITY

THIRTEENTH ANNUAL REPORT

OF THE

Indiana Agricultural Experiment Station

LAFAYETTE, INDIANA.

FOR THE YEAR ENDING JUNE 30, 1900.

To the Governor:

I herewith transmit the annual report of the Purdue University Agricultural Experiment Station for the year ending June 30, 1900.

Very respectfully yours,

WILLIAM V. STUART,
President of the Board of Trustees.

January 3, 1901.

To the President of the Board of Trustees:

I herewith present the thirteenth annual report of the Agricultural Experiment Station of Indiana for the year ending June 30, 1900, the same being required by Section 3 of an act entitled "An act to establish agricultural experiment stations in connection with the colleges established in the several States, under provisions of an act approved July, 1862, and of the acts supplemental thereto," and being in accordance also with the instructions of the Department of Agriculture.

This report consists of a report of the Director of the Station, and a financial report of the Secretary to the Board of Trustees.

WINTHROP E. STONE,
President.

January 3, 1901.

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STATION STAFF.

James H. Smart, LL. D., President.*

Winthrop E. Stone, A. M., Ph. D., Acting President.

Charles S. Plumb, B. S.....Director
 William C. Latta, M. S.....Agriculturist
 James Troop, M. S.....Horticulturist
 Henry A. Huston, A. M., A. C.....Chemist
 Joseph C. Arthur, D. Sc.....Botanist
 Arvill W. Bitting, M. D., D. V. M.....Veterinarian
 William Stuart, M. S.....Assistant Botanist
 A. Hugh Bryan, E. S., A. C.....Assistant Chemist
 John Harrison Skinner, B. S.....Assistant Agriculturist
 H. E. Van Norman, E. S.....Farm Superintendent and Assistant

*Died February 21, 1900.

THIRTEENTH ANNUAL REPORT
OF THE
PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION

FOR THE YEAR ENDING JUNE 30, 1900.

REPORT OF THE DIRECTOR.

To President W. E. Stone:

Sir—I take pleasure in herewith submitting to you the thirteenth annual report of this Station, covering the year ending June 30, 1900.

The work of the Station has been continued along the same lines as heretofore, with no essential change. In the Chemical Department sugar beet investigations have received the larger share of attention, and a large amount of seed was distributed this spring to beet growers in northern Indiana. In the Veterinary Department two subjects have received special attention over all others, viz.: hog cholera, and a disease among sheep which seems new to this region, yet which has been prevalent this spring over northwestern Indiana, which has been termed "influenza." This malady has been attended with much fatality, and thus far no satisfactory method of treatment has been determined by our veterinarian. In the Botanical Department special emphasis has been laid on pot culture work to determine the most desirable application of plant food to growing vegetables and flowering plants, and mushroom culture has received attention in the pit provided for that purpose. The opportunities for investigation in each of these fields are of a very superior sort. In this connection it will be desirable for the Station to provide itself with a more permanent mushroom cellar at no far distant day, our present one being of too temporary a character. In the work with field crops no change has been attempted, but the work on forage plants has been some-

what elaborated on, this being a subject of considerable interest to Indiana farmers. The horticultural work remains much as usual in character. In the Live Stock Department special emphasis is being given to the feeding of swine. The new feeding house is proving itself to be well suited to our work, and pig feeding experiments are in constant progress.

Among the subjects under investigation by the different departments of the Station, the following essentially include all:

1. The influence of protein food on growing chickens.
2. Feeding condimental food to pigs.
3. Feeding sugar beets to pigs.
4. Dry versus moist food for pigs.
5. Feeding value of dried distillers' grains for horses.
6. Hill and drill planting of corn.
7. Deep and shallow cultivation of corn.
8. Deep and shallow planting of corn.
9. Thick and thin planting of corn.
10. Breeding and selection of corn.
11. Rotations, including corn, with and without fertilizers and manures.
12. Variety tests of oats.
13. Rotations including oats.
14. Variety tests of wheat.
15. Tests of mixed seeds of wheat.
16. Tests for treatment for smut of wheat.
17. Rotations including wheat.
18. Methods of planting cow peas and soy beans.
19. Tests of varieties of cow peas and soy beans.
20. Tests of grasses and clovers.
21. On the value of chemical fertilizers for greenhouse crops, especially tomatoes, lettuce, radishes and chrysanthemums.
22. Sub-watering as applied to greenhouse crops.
23. On the use of formalin as a fungicide, especially for the smuts.
24. A study of the rusts, especially those affecting cultivated plants.
25. The action of corn smut on the animal system.
26. The "damping off" of sugar beets.
27. Mushroom culture in pits.
28. The epidemiology of hog cholera.
29. Prevalence of sheep scab.
30. Serum treatment of tetanus.
31. Clinical features of influenza.
32. The period of gestation.
33. Miscellaneous observations upon diseases as occurring in clinics.
34. Spraying, and the effects of different insecticides and fungicides.
35. Close root pruning and its effect on different trees.

36. The effect of climate on forest tree seedlings.
37. The effects of different combinations of commercial fertilizers upon different varieties of tomatoes.
38. Testing varieties of vegetable seeds sent by the U. S. Department of Agriculture, to ascertain their adaptability to this climate.
39. Varietal tests of small fruits.
40. Varietal tests of orchard fruits.
41. Sub vs. surface irrigation in forcing vegetables.
42. Effect of different combinations of fertilizers on forcing vegetables.
43. Field experiments on the influence of fertilizers on tomatoes.
44. Laboratory investigations on the composition of greenhouse tomatoes.
46. Field experiments on the influence of fertilizers on the sugar beet.
47. Field experiments with the sugar beet in different parts of Indiana.
48. The composition of diseased sugar beets.
49. Analyses of marl, peat and muck, "alkali incrustation" of soil, limestone for beet sugar factories, corn cob ash, hominy feed, corn from experiment plats, cow peas and soy beans, ground oat food, oat clippings, distilled dried grains, formaldehyde, butter, milk, casein and albumen in milk.
50. Special water examinations.
51. Special determinations of starch and of carbohydrates extracted by sodium hydrate from feeding stuffs.
52. The digestibility of carbohydrates extracted from hay by sodium hydroxide.

The Station Staff has remained unchanged during the year. Dr. Bitting, as during the year preceding this, has given the Station but half of his time, owing to leave of absence while pursuing medical studies at Indianapolis.

No special improvements have been effected this year. I, however, desire to most earnestly recommend that a new and suitable sheep building be erected for combined Station and College work. The present building is, to say the least, a discredit to the institution and to the State, and should be replaced at an early date by something better and adapted to our work. The horticultural department should also be provided with a small shed and tool house in the garden or orchard, in which convenient accommodations may be afforded this department. Thus far, this department has not had any special or independent accommodations, making use of a part of the general tool building, and at considerable inconvenience.

Publications have been issued as follows during the past year;

PAMPHLET BULLETINS.

Bulletin No. 79, June, 1899, pp. 53-62. Roots as food for pigs. By C. S. Plumb and H. E. VanNorman.

Bulletin No. 80, September, 1899, pp. 63-76, figs. 5-12. Sheep scab. By A. W. Bitting.

Bulletin No. 81, December, 1899, pp. 77-92. Field tests with fertilizers on heavy clay land. By H. A. Huston.

Bulletin No. 82, March, 1900, pp. 93-105. Roots and other succulent food for swine. By C. S. Plumb.

NEWSPAPER BULLETINS.

No. 77, July 27, 1899. Milk dilution separators. By C. S. Plumb, Director.

No. 78, August 28, 1899. Causes for inferior quality of muskmelons, and remedy. By James Troop, Horticulturist.

No. 79. September 29, 1899. The use of so-called serum as a hog cholera remedy. By A. W. Bitting, Veterinarian.

No. 80. October 14, 1899. Asparagus rust: A serious menace to asparagus culture. By William Stuart, Assistant Botanist.

No. 81, March 21, 1900. The distribution of seeds by the Indiana Experiment Station. By C. S. Plumb, Director.

No. 82, March 24, 1900. Awnless brone grass (*Bromus inermis*.) By W. C. Latta, Agriculturist.

No. 83, April 14, 1900. The so-called new treatment for hog cholera. By C. S. Plumb, Director.

No. 84, May 14, 1900. The soy bean. By W. C. Latta, Agriculturist.

No. 85, June 14, 1900. The summer care of milk and cream. By H. E. VanNorman, Dairy Assistant.

ANNUAL REPORT.

Twelfth Annual Report of the Indiana Agricultural Experiment Station, Lafayette, Indiana, for the year ending June 30, 1900, pp. 150, plates XIII, fig. 1.

In addition to the above, members of the Station staff have published many miscellaneous articles in the agricultural press, or have presented addresses before associations identified with agriculture in some special field.

MAILING LIST.

- The Station mailing list has now reached such dimensions, that it will be desirable and necessary to revise it all through during next year. On July 1, this list exceeded over 17,000 names, to many of which our publications have been sent for years with no acknowledgment from the recipients. Undoubtedly many bulletins are being thrown away by being mailed to addresses of persons deceased or removal from the postoffice addresses to which bulletins are sent. The following table shows the growth of our mailing list for eight years:

TABLE I.
STATION MAILING LIST.

NUMBER NAMES ON LIST.	Jan. 18, 1893.	Jan. 4, 1894.	Jan. 10, 1895.	Jan. 1, 1896.	Jan. 1, 1897.	Jan. 1, 1898.	June 30, 1899.	Aug. 1, 1900.
People in Indiana	5,741	7,131	8,866	9,143	10,590	11,900	13,458	14,308
Indiana periodicals	635	668	63	625	660	630	636	636
People in other States	1,158	1,316	1,606	1,788	1,872	2,000	2,200	2,303
Periodicals in other States ..	83	91	85	92	76	80	96	100
Foreigners	26	51	61	77	91	105	112	98
Foreign periodicals	7	7	7	6	8	8	10	7
Total	7,650	9,264	11,079	11,731	13,297	14,750	16,512	17,452

The work of the Station is progressing smoothly, and during the year to come more experiments will be reported on in bulletin form than has usually been the case.

This report contains numerous communications on experimental work conducted by the writers. I recommend that 2,500 copies of this report be printed.

Respectfully submitted,

C. S. PLUMB,
Director.

THE ASPARAGUS RUST.

J. C. ARTHUR.

The first knowledge of the appearance of rust upon asparagus in Indiana came to the Station through Mr. L. C. Breyfogle, of Crown Point, Lake County, who sent, October 2, 1899, a specimen of asparagus thickly covered with rust, with the statement that his whole field of seven acres was in the same condition. Shortly afterward a newspaper bulletin¹ was issued from the department calling attention to the invasion of the rust and some means of guarding against it. Up to June of the present year (1900) no other locality in the State was known to be invaded by the rust, although there is reason to believe that since that date it has spread extensively.

The asparagus rust was first recorded for this country by Prof. B. D. Halsted², who became aware of its presence in New Jersey in August, 1896. It was soon after found in Massachusetts by Dr. G. E. Stone³, and

¹ Stuart, William—Asparagus rust, a serious menace to asparagus culture. Newspaper Bull. Ind. Exper. Sta. No. 80. Oct. 14, 1899.

² An outbreak of the asparagus rust. Issued as a circular from the N. J. Exper. Station. Sept. 18, 1896.

³ Ninth Rep. Hatch Exper. Sta. for 1896 : 72.

was probably already well distributed along the coast region from Delaware to Massachusetts, judging by subsequent investigations. On Cape Cod it appears to have existed for a year or two prior to this date*, but the exact place and means of its introduction to this country are wholly unknown.

The asparagus rust is one of several kinds of rusts that have recently invaded North America from Europe and that have proved disturbing and often seriously harmful factors for the cultivator to contend with. The carnation rust, the hollyhock rust and the chrysanthemum rust are prominent among these, having received much attention from both botanists and cultivators. The asparagus rust is likely soon to force attention from every one who grows this crop, on account of its conspicuously harmful effects, although like other rust diseases, it will doubtless fail to appear some seasons, or at least remain inconspicuous. But no hope can be held out that it will ever cease hereafter to be troublesome in this country, or that it can be stamped out from even a limited region. The only outlook for the cultivator is to learn how it can be controlled and rendered the least injurious; there is no prospect of banishing it.

When asparagus is attacked by rust (*Puccinia Asparagi* DC.) it shows numerous spots along the stems, both main stems and the smaller branches, and the plants ripen prematurely, turning yellow and often becoming dry and dead many weeks before the usual time. These spots are oval or elongated, just large enough to be seen clearly without aid of a magnifying glass. They start like a blister, but soon burst open and expose a brown or a black powder. The brown powder, which consists of uredospores or summer spores, so called because serving to spread the rust during the warm months from July on, dusts out easily, and rubs off readily on the fingers. The looseness of this powder permits it to be carried away in abundance by the winds and scattered over other asparagus plants near and far, where the disease is started afresh by growth of the spores forming the powder. The black powder does not fall out or rub off readily, being formed later than the other kind, and is made up of spores intended only to grow after passing the winter and when the warmth of another growing season has arrived. It is formed of teleutospores, or so-called winter spores, which are incapable of growth until after a prolonged period of rest.

Beside these two kinds of spores, which are not always told apart with certainty except by help of a microscope, there is another kind, the aecidiospores, or so-called spring spores. These are quite unlike the other two kinds, being bright yellow and formed in minute whitish cups just large enough to be seen by the unaided eye, and usually appearing in groups. This form of the rust is frequently called the cluster-cup stage. It appears from May to July. So far, this stage seems to be rarely pro-

* Stone and Smith. The asparagus rust in Massachusetts. Bull. Hatch Exper. Sta. No. 61 : 5.

duced in this country, and were it not that it has an important relation to the vigor and therefore the harmfulness of the rust it might be ignored. The fewer cluster-cups produced, the less will be the intensity of the disease that season, compared to what it would have been had more cluster-cups been formed. This does not mean, of course, that the fewer the cluster-cups the less rust, because the amount of rust depends upon the summer spores and a state of the weather encouraging their spread and growth, but it means that whatever the amount of rust it will be deprived of some of its power of injury the fewer cluster-cups that precede.

There are three direct ways of combating the asparagus rust: (1) destroy the spring spores, which can be done best by hand-picking, as they are usually few; (2) spray frequently with fungicide for a month or two, beginning when cutting stops, in order to prevent both spring and summer spores carried through the air from growing on the surface of the plants to start the disease, and (3) destroy the winter spores by burning over the ground in autumn, or by some other means, thus preventing germination the next spring.

The first of these methods needs no explanation, except to suggest that the careful cultivator will take considerable pains to keep a close watch for cluster-cups and see that they are destroyed, which means annihilated by burning, not thrown on the ground to wither.

The second method has been tried by the New Jersey and New York stations and so far without large success. Their experiments show that the standard Bordeaux mixture is somewhat too strong for asparagus, making it better to use a weaker solution, and that owing to the difficulty of making the solution adhere some resin should be added to it.

When the sprayings are done at short intervals, about a week or less, so that the rapidly growing shoots do not become infected between sprayings, a considerable reduction of the rust has been obtained, but whether this will warrant the commercial application of the method is not yet fully determined.

The third method is readily applied in the main, although to be certain of destroying all the winter spores in a field presents difficulties. If the dead tops are gathered into piles and burned, many spores are destroyed, but also many of the smaller branches well covered with rust will be scattered over the ground and escape. On the other hand, the whole field may be burned over without cutting. There is danger in this method that the tops will not be thick enough in places, or the heat intense enough to burn all the rusted material, especially when some of the tops are still green. To obviate this difficulty straw may be distributed over the field in quantity to insure thorough action of the flames. The burning should be done late in the season, after growth has ceased, for not only will there be more difficulty earlier in making all the material burn, but checking the fall ripening of the underground buds will weaken the next season's growth and consequently cause a greater number of small

shoots to start. Stirring the surface soil in fall after burning or as early in the spring as possible, so as to bury, however slightly, the bits of rusted debris will be an additional safeguard. The free use of lime or salt on the field will also tend to prevent the germination of the spores.

There are indirect methods that may be used effectively against the rust. It has been observed by Professor Halsted,⁵ of the New Jersey Station, that in their grounds two varieties were much less affected by rust than the others, eight varieties in all being tested. The Palmetto had scarcely more than half as much rust as the others, excepting a French variety, the Giant Argenteuil, not yet much grown, which had only a third as much rust. The last, however, was not in fair growth for the test, as it was from seed, and seedlings are generally less susceptible than older plants of the same variety. This selection of rust resisting varieties may possibly prove a feasible method of reducing loss from this disease, although it can not yet be asserted with much confidence.

Another indirect method is to select soil that will supply abundance of moisture during midsummer, or when possible arrange to irrigate during the dry part of the season. This suggestion is based upon the observation of Dr. Stone⁶, of the Massachusetts Station, who found that the injury from rust was far greater in fields with light porous soil incapable of retaining soil moisture during dry periods. The reason for this lies partly in the fact that the rust breaks open the surface tissues of the asparagus plants and thus allows the moisture from the inside of the plants to escape readily, in the same manner as puncturing the surface with needles would do. The plant is thus deprived of moisture faster than the roots can supply it from a deficient soil, and the plants are unable to make suitable growth. It is also claimed that plants making continuously vigorous growth are less attacked by rust than those permitted to be checked through lack of moisture for the roots. Altogether the evidence points to a decided advantage in lessening the injury from rust by providing the conditions that ensure a strong and continuous growth of the plants.

Another indirect method of controlling the rust is to take pains to remove all scattered plants of asparagus growing in hedge-rows, fields or elsewhere in the vicinity. If this is not done, they become centers for the distribution of rust spores and the propagation of the disease. The distance which spores may be carried by the wind is undoubtedly very considerable and careful attention to a field may be rendered quite ineffective by infection from stray plants.

A natural check to the rust occurs in fungous parasites that grow and feed upon the spores. There are two of these known, one of which (Dar-

⁵ Twentieth Rep. N. J. Exper. Sta. for 1899:411.

⁶ The relationship existing between the asparagus rust and the physical properties of the soil. Twelfth Rep. Hatch Exper. Sta. for 1899:61-73.

luca flum Cast) has been observed in Indiana. There is no method known, however, by which it can be propagated or fostered.

SUMMARY.

Asparagus rust, first certainly noticed in this country in 1896, has appeared in Indiana.

The rust promises to do considerable injury to the asparagus crop, at least during some seasons.

The rust has three kinds of spores, the spring spores, which are rarely formed; the summer spores, which serve to spread the disease rapidly; and the winter spores, which carry the infection over the winter.

Direct methods of controlling the rust are to destroy the spring spores as they appear by hand-picking, spray frequently after spring cutting is finished to prevent spread of the disease, and burning the plants in autumn to destroy the winter spores.

Indirect methods are to select rust-resisting varieties, if such there be, and provide moisture to ensure good growth of plants during dry periods, if this be feasible.

DAMPING OFF OF BEETS IN THE FIELD.

J. C. ARTHUR.

A case of damping off in field culture of beets came to the notice of the department in May, 1900, and appears to be the first instance of the kind on record. The trouble occurred in the northern part of the State on the farm of Mr. E. T. Mudge, of Medaryville, destroying the larger part of the beets in a field of fifty acres. Samples of healthy and diseased beets, and of the soil in which they grew, were sent to this Station, providing ample material for study.

The beets at the time of the attack were in the first to third leaf following the seed leaves, having been planted about three weeks, and therefore still small seedlings. The roots and stem below ground became black and lifeless, especially the part just beneath the soil, and the top, deprived of nutriment, dropped over on the ground and withered. There was no indication of insect work of any kind. An examination of the roots with a microscope revealed the constant presence of fungous mycelium in the softer tissues. The fungus was composed of colorless branching threads of quite uniform size, winding about between the cells of the cortical part of the root. Comparing the fungus and the behavior of the

diseased plants with what is known regarding damping off, as seen commonly in greenhouses, there appears to be no doubt that here was a case of this sort of disease appearing in field culture.

Damping off is due to attack from any one of a number of species of fungi. Attempts were made to induce the fungus in the beet seedlings to fruit by putting into moist chambers, but without avail. In the absence of fruiting parts, it is impossible to name the fungus or even to intelligently guess at its identity. All that can be said is that owing to the attack of some fungus, capable of penetrating the live tissues of the beet seedling, the young plants were killed.

The conditions under which damping off fungi flourishes in the greenhouse are moisture, warmth, and a closeness of the plants that enables the fungus to readily extend from one plant to the next through the damp soil. These conditions are most often met in the cutting bench. If the soil contains decaying vegetable matter, thus furnishing nutriment for the fungous filaments as they extend out from the infested plant, there is a correspondingly greater luxuriance in the development.

All these conditions appear to have been fulfilled in the field of diseased beets at Medaryville. The soil was a black, sandy loam; the seedling beets were close enough together in the row to enable the fungus to pass from one plant to the next from end to end of the field; and the warm, damp days in May furnished most favorable atmospheric conditions; and lastly the earth was of that peculiar richness and texture well fitted to promote saprophytic growth. There is a high probability, therefore, that the fungus, very likely starting from many centers, spread along the rows throughout the field, missing, of course, some drier spots and isolated plants, and by its vigorous growth brought about wholesale damping off.

The fungus originated, probably, not from the soil, but from the seed used for planting. The rough, spongy husk of beet seed provides a good harborage for fungus spores, but this growth usually does no harm to the seedling beets from absence of favoring conditions. Although some sorts of spores are present in about all beet seed, yet it may be doubted if those of the particular kind capable of causing damping off are always, or even usually, present.

I am informed by Mr. Charles K. Farmer, field superintendent of the Wolverine Sugar Company, that a disease very similar to this one, affected young sugar beets in Michigan during the spring of 1899. It passed under the name of "black root," and differed from the Indiana outbreak chiefly in its failure to kill the plants outright. The surface tissues of the roots blackened, but the central axis remained alive, and in fields that were not plowed up, the plants largely recovered. No microscopical examination was made.

A remedy for the disease, after it has once started in a field, seems out of the question. Sometimes, however, weather or other conditions check its spread. It would probably be possible to sterilize the beet seed used

for planting. Either formalin or hot water could doubtless be used to destroy the fungous spores without impairing the vitality of the seed, and possibly with direct beneficial effects in promoting germination. Details for treatment can not be given, as no experiments have been made. If this method of ridding the seed of the germs of disease proves available, it might be profitable to treat all beet seed before planting, but especially that to be used in fields having certain rich, light soils.

FORMALIN AND HOT WATER AS PREVENTIVES OF LOOSE SMUT OF WHEAT.

J. C. ARTHUR.

The loose smut of wheat is a prevalent source of loss to the farmer. There is a saying that "the more smut, the better the crop," which is a fallacious and misleading observation, based no doubt on the fact that conditions which promote the development of the smut parasite, and therefore in seasons giving a heavy growth of wheat, the smut is likely to be unusually conspicuous. Under such conditions it is not rare for the loss due to smut to be as high as 25 to 50 per cent. of the crop. In spite of this loss the yield of grain may be good, but it would have been just so much the better if the smut could have been prevented. The prevalence of loose smut in wheat varies greatly from year to year, but very often amounts to 10 per cent. of the crop. The loss is almost certain to be considerably greater than casual observation seems to suggest, on account of the inconspicuousness of wheat heads attacked by it.

In the earlier bulletins¹ on grain smuts issued by this Station, it was recognized that loose smut was more difficult to eradicate from wheat than the stinking smut, but in the absence of definite knowledge the assumption was made that the fungicides used against stinking smut would also serve against loose smut, if carefully applied.

In 1891, Messrs. Kellerman and Swingle² made extensive trial of fungicides for loose smut, 54 lots being treated, but without decisive results. The amount of smut in the control lots was, however, small, which added to the uncertainty of the test. Their conclusion was that "no grounds based on actual experiment appear to exist for recommending the treatment of the seed with hot water or any other fungicide." A careful review of their data seems to me to show that some forms of their treatment did reduce the amount of smut, but that none showed indications of proving efficient in removing all smut.

¹Arthur, Smut of Wheat and Oats, Bull. Ind. Exper. Sta., No. 26, September, 1899; and Treatment for Smut in Wheat, same, No. 32, July, 1900.

²Bull. Kans. Exper. Sta., No. 22.

The same year this Station also made experiments with loose smut, and the results are here published for the first time. The seed grain used for the test was saved from crops grown on the Station grounds during 1890. Two varieties were employed, the Original Red and the Ontario Wonder. A careful estimate made in the field by counting two or three thousand stalks* gave nearly 12 per cent. of smut for the former and over 24 per cent. for the latter, so that the seed available for the test was sufficiently contaminated with smut to ensure marked results.

The seed was treated by immersing five minutes in water at a temperature of 135 Fahrenheit. It was sown October 22, 1891, the day after treatment, each variety occupying two drills, 66 feet long, with an equal area sown with untreated seed as a control. The wheat of all four lots grew well, passed the winter without injury, and gave a good yield. The amount of smut was estimated the middle of June, 1892, with the result that no perceptible influence of the treatment could be detected. The data are given in table II.

TABLE II.
HOT WATER TREATMENT FOR LOOSE SMUT OF WHEAT IN 1891-2.

VARIETY OF WHEAT.	Number of Stalks Counted.		Per Cent of Smut.	
	Untreated.	Hot Water 135° for Five Minutes.	Untreated.	Hot Water 135° for Five Minutes.
Original Red.....	3,127	3,318	6	5 6
Ontario Wonder.....	2,579	2,579	15.75	15.85

The amount of smut showing in the resulting crop, although nowhere near so much as in the previous crop from which the seed was taken, was still sufficiently high to make conspicuous any variation that might be traceable to the treatment. That the two varieties of wheat showed correspondingly less smut in 1891 than in 1890, may have been due to several causes, but judging from a number of incidental observations in connection with other experiments as well as this it was probably due largely to the extra manipulation the seed received in cleaning and treatment, which separated the spores to a greater extent than in the usual handling.

A much more elaborate set of experiments was tried in 1898-9 with the aid of the assistant botanist, Mr. William Stuart, in which both hot water and formalin were used. As formalin had been found efficacious against

* For exact data see Bull. Ind. Exper. Sta., No. 32, p. 9.

stinking smut of wheat, it seemed highly probable that a right adjustment of strength and length of treatment would show that it could also be used for loose smut, while it was by no means certain that hot water by some method of application would not yet prove serviceable. The two methods were also combined, the solution of formalin being used both hot and cold. The treatment was made especially severe in order to kill the smut spores if possible, though part of the seed might in consequence also be killed. Formalin (40 per cent. formaldehyde) was used in two strengths, one pound of formalin (9.072 gr., 8.2 cc.) to 50 gallons of water, and one to 25 gallons. Less than a pound of seed was treated in each lot.

In order to be more certain of the exact effect of the treatment upon the vitality of the seed, a laboratory test for the germination was made, using 200 seeds of each lot placed in a Geneva germinator. It showed that much of the seed was injured, the degree of injury corresponding very well to that shown by vegetation in the open field, but less pronounced. In the field some of the lots not only came up poorly, but grew feebly, and were much injured during the winter. Further data are given in table III.

TABLE III.

LABORATORY AND FIELD OBSERVATIONS ON VITALITY OF SEED, 1898-9, TREATMENT BEING IN SMALL LOTS.

TREATMENT.	Per Cent. Germination in the Laboratory.	Field Observation.
Untreated	97	Good.
Formalin 2 hours, strength 1-50, at about 73°	96	Good.
Formalin, 2 hours, strength 1-25, at about 73°	90	Medium.
Formalin, 14 hours, strength 1-25, at about 73°	42	Poor.
Formalin, 10 minutes, strength 1-25, at 135°	34	Very poor.
Hot water, at 132°, Swingle method*	84	Medium.
Hot water, 10 minutes, at 135°	63	Poor.

The seed was sown September 26, one week after being treated, by means of a hand drill. One strip of six rows was sown for each kind of treatment and two strips with untreated seed for controls. The growth was not as vigorous as usual, even from the untreated seed, and the winter weather also proved unfavorable to wheat, so that the stand of wheat in the spring was not good, and on some of the treated areas scarcely a plant remained. Moreover, the amount of loose smut showing in the untreated

*The method designated here as the Swingle method is given in Farmers' Bulletin No. 75 of the U. S. Department of Agriculture, written by Mr. Walter T. Swingle, and consists in soaking the seed four hours in cold water, permitting it to drain four hours, then plunging several times into water at 110° to 120°, and finally immersing five minutes in water at 132° to 133°.

H. B. C.

part of the crop was very small, as it had not been possible to secure seed from heavily smutted fields, as in the earlier experiments. Such results as were obtainable are given in table IV, and they can not be said to do more than indicate a bare possibility of finding a successful method of treatment. No smut is recorded for any of the treated lots, except that with hot water for ten minutes, which showed even more smut than the untreated lot. As this particular treatment was sufficiently severe to kill one-third of the seed, while it does not appear to have killed the smut spores, doubt is thrown upon the efficiency of the hot water treatment, unless it be assumed that a slower method of application be required, like that recommended by Swingle, which seemed to have killed all smut spores provided any were present, with even less injury to the seed. The four methods of using formalin appear to have been effective, and with two hours immersion at a strength of one pound to 50 gallons of water almost no injury resulted to the germinating qualities of the seed. Altogether, however, the test proved in many ways unsatisfactory and inconclusive.

TABLE IV.

RESULTS OF TREATMENT OF SMALL LOTS OF WHEAT FOR LOOSE SMUT, 1898-9.

TREATMENT.	Number Stalks Counted.	Per Cent. of Smut.
Untreated	2,169	.46
Formalin, 2 hours, strength 1-50, at about 75°	1,140	0
Formalin, 2 hours, strength 1-25, at about 75°	1,057	0
Formalin, 14 hours, strength 1-25, at about 75°	{ Too few to estimate.	...
Formalin, 10 minutes, strength 1-25, at 135° .....		...
Hot water, at 132°, Swingle method	1,421	0
Hot water, 10 minutes, at 135°	571	.53

Another test was made at about the same time, using larger quantities of seed and varying the form of treatment in accordance with information secured from the laboratory study of germination in the last trial as recorded in table III. It was made a test of formalin, used both hot and cold, with a number of variations in the method of application. Two lots of seed were used; one lot being Michigan Amber, grown upon the Station grounds, and the other an unknown variety grown by a neighboring farmer. In neither instance was the amount of smut especially marked in the field. About 8½ pounds (4 kilograms) of seed were treated at a time.

With the Michigan Amber wheat a rather strong solution of formalin (one pound of formalin to 25 gallons of water) was used, and the time of immersion reduced to one-half an hour, and the application made both hot and cold. The temperature for the hot solution was 136 degrees when the seed was put in, and this was allowed to drop without hindrance.

Immersing the seed caused the temperature to drop at once to 126 degrees, ten minutes later it was 118 degrees, after 22½ minutes it was 113½ degrees, and at the end of the half hour 113 degrees. Two forms of control were also given a half hour soaking in water. The latter was done to offset the soaking required in using formalin, and was expected to show if the washing and swelling of the seed had any effect in itself upon either the growth of the seed or the action of the smut.

For the other variety of wheat the formalin solution was made twice as weak (one pound of formalin to 50 gallons of water), the time of immersion extended to two hours, and the application made as in the former case both cold and hot. For the hot solution the temperature dropped when the seed was immersed from 127 to 122 degrees, in 55 minutes it stood at 108½ degrees, and in an hour and a quarter at 105 degrees, in an hour and three-quarters at 101½ degrees, and at the end of the two hours at 101 degrees. Only the customary untreated control was used.

After treatment 200 seeds of each lot were placed in a Geneva germinator. The result, see table V, showed that the formalin treatment in each case injured the germinating qualities of the seed more or less, especially when the hot solutions were used. The seed was sown September 29, three days after treatment, with a two-horse drill set to sow five pecks per acre. The vegetation, as seen five days afterward, the weather having been especially favorable, was good except where the seed had been treated to hot solutions of formalin, these being only fair. A good fall growth was made, but the winter proved unusually severe, and all of the plats suffered, especially along the south halves, where the soil was less favorable to a vigorous growth, but plats having formalin treatments showed the greatest injury. When the wheat began to ripen by the middle of June the treated plats still showed a difference by being somewhat behind the others. The smut was estimated on June 13, by counting one to two thousand stalks in each plat, the data being given in table V.

TABLE V.

TREATMENT OF LARGE LOTS OF WHEAT FOR LOOSE SMUT—1898-99.

Kind of Wheat.	TREATMENT.	Per Cent. Germination in the Laboratory.	Per Cent. Smut in Crop.
Michigan Amber.	Untreated	99	1.78
	Cold water, ¼ hr., at 71°	98	1.21
	Formalin, ¼ hr., strength 1-25, at 75°	88	1
	Formalin, ¼ hr., strength 1-25, at 136° falling to 113°	74	1.10
Unknown Variety.	Untreated	96	.63
	Formalin, 2 hrs., strength 1-50, at about 75°	90	.33
	Formalin, 2 hrs., strength 1-50, at 127°, falling to 101°	67	.26

1899

About three times as much smut developed in the Michigan Amber as in the other variety, giving figures sufficiently large to establish considerable confidence in the results. What strikes one as especially noticeable is the failure of the formalin, however applied, to eradicate the smut, even where the treatment was severe enough to kill nearly a third of the seed. It is apparent, however, that the treatment did reduce the smut, amounting to about 63 per cent. in the extreme case, but that this reduction was to any considerable degree due to the fungicidal action of the formalin or hot water may be doubted. It is to be observed in the first place that the same strength of formalin applied cold gave better results in both instances than when applied hot, and yet it is a well established fact that water at the high temperature here used has no mean fungicidal value. It is also to be observed that seed simply soaked in cold water gave a reduction of 32 per cent. of smut over that unsoaked, and certainly no fungicidal action can be ascribed to cold water.

It is the belief of the writer that this reduction of smut is not due materially to any destruction of the smut spores by the treatment, but chiefly or wholly to the incidental removal of the spores by the additional manipulation that the treated seed receives. Many of the spores are washed away by the water in which the seeds are immersed, as is readily shown by putting a drop of the solution under the microscope, and many more are removed in the process of drying and other extra handling. It is believed that the reduction of smut obtained by the several forms of treatment may be practically accounted for by assuming that the seed is considerably freed from smut incidentally rather than that the smut is killed by the treatment.

Some attempt was made to ascertain directly what action formalin and hot water had upon the smut spores by treating small quantities of smut after the several methods used for the seed and then testing their viability by placing in a hanging drop in a moist chamber, the examination being made with a microscope. Loose smut gathered the middle of June showed abundant germination. For want of time no further examination was made for three weeks, when it was found that the spores which had in the meantime lain in the laboratory would not germinate readily. Smut brought directly from the field during the second week of July showed but moderate germination. Several forms of treatment were attempted, but owing to the indifferent growth of the control sets, the results are not considered reliable and are omitted. The loss of viability by moderate desiccation is an unexpected phase of the problem, for which no explanation can at present be offered. There is evidently need of a more critical examination into the life history of the smut fungus, in order that we may know how surely proposed remedial treatment is directed against the vulnerable part of its cycle.

PRACTICAL DEDUCTIONS.

A study of the above data leads to a pretty definite conclusion that the loose smut of wheat can not be removed from a crop by treatment of the seed with formalin or hot water, not even when the treatment is so severe as to kill a third or more of the seed. The statement made by the writer in an earlier bulletin of this Station (No. 77, p. 39) still holds good, even after making studies that were expected to overthrow it, that "at present there is no satisfactory remedy or preventive to be recommended for this kind of smut."

There are indirect methods for getting rid of loose smut in wheat, however, that are clearly worthy of attention. That recommended by my colleague, Professor Latta¹⁰, should be used when feasible. He advises selection of seed from fields known to be free from smut and sowing on land that has not borne wheat for two or three years. In this connection let it be remembered that the loose smut of oats is wholly distinct from that of wheat, and no transfer of one to the other can take place, so that wheat may follow oats as safely as to follow potatoes or corn. Professor Latta also says that "in all cases it is desirable to thoroughly screen wheat for seed, using a strong blast which will dislodge and blow out at least a portion of the smut germs." This last suggestion seems to me, in view of the facts here recorded, to be worthy of special emphasis. A good use of the fanning mill will certainly lessen the smut in the crop, if any spores are present, and will also remove seeds of noxious weeds and the inferior part of the grain, altogether greatly raising the standard of purity and quality.

FORMALIN AS A PREVENTIVE OF MILLET SMUT.

WILLIAM STUART.

In the spring of 1890, some seed which had been obtained from a badly smutted field of millet, was treated with formalin for the prevention of smut. It was divided into five lots, each of which received different treatment. The treatment given each lot was as follows:

Lot I. Soaked one hour in a solution of formalin at the rate of one pound formalin to sixty gallons of water, a 1 to 60 gallon solution.

Lot II. Soaked two hours in a solution of the same strength as I, a 1 to 60 gallon solution.

Lot III. Soaked one hour in a solution of formalin at the rate of one pound formalin to 45 gallons of water, a 1 to 45 gallon solution.

¹⁰ Bull. Ind. Exper. Sta. No. 45, p. 61. 1893.



Lot IV. Soaked two hours in the same solution as Lot III, 1 to 45.

Lot V. Soaked one hour in cold water.

The seed was planted June 5 and made a good growth during the season. On August 9, when well headed out, the per cent. of smut in each plat was estimated by counting a large number of heads. The results of this count, which are given below, shows that the smut was entirely prevented in lots III and IV, which had been soaked in the stronger solution of formalin.

Lot I, treated one hour in a 1:60 solution, contained .08 per cent. smut.

Lot II, treated 2 hours in a 1:60 solution, contained .86 per cent. smut.

Lot III, treated 1 hour in a 1:45 solution, contained no smut.

Lot IV, treated two hours in a 1:45 solution, contained no smut.

Lot V, soaked 1 hour in cold water, contained 2.86 smut.

Those of I and II, while not entirely free from smut, showed a very appreciable decrease from the untreated lot, V, which contained nearly 3 per cent. The discrepancy between I and II, the former having only .08 per cent. of smut, while the latter contained .86 per cent., is probably a purely accidental feature.

The results of the experiment as a whole point conclusively to the efficiency of formalin as a preventive of millet smut. Seed soaked either one or two hours in a formalin solution at the rate of one pound formalin to forty-five gallons of water, should effectively rid the resultant crop of smut.

A STUDY OF THE CONSTITUENTS OF CORN SMUT.

WILLIAM STUART.

In preparing the material for the article upon corn smut, published in the last annual report¹¹, several topics then under observation were necessarily left incomplete. Some of the more interesting results of these studies are given here, as in a measure supplemental to the publication of last year. The work has been performed under the direction of Dr. J. C. Arthur.

Tests for Alkaloidal Salts. This work was carried out by the writer, with much valuable assistance and oversight, especially at the first, from Prof. J. W. Sturmer, of the Purdue School of Pharmacy. The methods employed in this investigation were to make an extract of the smut pores and such detritus as would pass through a fine sieve, and then by the use of standard alkaloid reagents to note whether precipitates were formed or not. Only qualitative tests were made.

¹¹Arthur and Stuart, Twelfth An. Rep. Ind. Exper. Sta., 84-135.

In one case one hundred grams of the selved smut spores were taken and after thoroughly moistening them in a dish by adding 33½ per cent. alcohol and stirring together, the whole mass was again passed through a sieve to break up lumps and transferred to a percolator previously fitted up for the purpose. The mass of spores were pressed down firmly, then covered with a filter paper so molded as to cover the surface of the spores and to extend up the sides of the percolator about three-quarters of an inch. A few pieces of glass rod laid upon the filter paper sufficed to keep it in place. Sufficient alcohol of one-third strength was then added to the percolator to cover the spore mass to a depth of about one-half inch. The top of the percolator was covered with a petri dish to prevent the evaporation of the alcoholic solution. As the alcoholic solution was absorbed by the corn smut spores additional liquid was added. Maceration of the smut spores was continued for twenty-four hours before any of the liquid was allowed to percolate through into the receiver, percolation being prevented by adjusting the receiving flask above the level of the material in the percolator. After twenty-four hours' maceration in the alcohol, the receiving flask was lowered and adjusted so as to permit of about two drops passing over into the flask per minute. Percolation was continued until the percolate was colorless, usually from two to three days, sufficient alcohol being added to keep the surface of the spores covered. The first 50 cc. of the percolate was set aside and the balance collected and evaporated down to 50 cc. on a steam bath. This was added to the first amount saved, making 100 cc. of the extract, each cc. of the extract representing one gram of the spores.

To test the extract for alkaloids, a certain amount of it was taken and evaporated to dryness on a steam bath. The residue was treated with a five per cent. solution of sulphuric acid and filtered. The filtrate was then subjected to tests with the following reagents:

1. Potassium mercuric iodide (Mayer's solution).
2. Phosphotungstic acid.
3. Iodine in potassium iodide solution.
4. Picric acid.

A small quantity of the filtrate was poured into four watchglass crystals and then a drop or two of the reagent used. If no precipitate was formed, a few more drops of the reagent were added. The reactions obtained by this method were as follows:

- Reagent 1. A slight milky turbidity was produced.
Reagent 2. A decided milky turbidity was produced.
Reagent 3. No visible reaction could be noted.
Reagent 4. No visible reaction could be noted.

A number of tests with the same and with fresh lots of extract prepared in the same manner gave similar results.

Test for Total Alkaloid (short method).—The second method employed for extracting corn smut fluid was that of using a modified "Prollius' Fluid."¹²

To 50 cc. of Prollius' fluid in a conical flask was added two grams of corn smut; the flask was stoppered securely with a cork made impervious to ether and vigorously shaken at intervals. After macerating four hours the supernatant solution was drawn off and filtered. The filtrate was evaporated to dryness on a steam bath and the residue treated with a five per cent. sulphuric acid solution. The acid solution was filtered and the filtrate tested with the reagents as mentioned for the alcoholic solution. The reactions obtained were as follows:

- Reagent 1. A slight turbidity was produced.
- Reagent 2. A marked milky turbidity was produced.
- Reagent 3. No reaction could be observed.
- Reagent 4. No reaction could be observed.

Test for Total Alkaloid (general method).—The method employed in this test was that outlined by Messrs. J. W. Sturmer and C. E. Vanderkleed¹³, called "Process one."

General.—"For total alkaloid." The process was to take ten grams of the corn smut and after transferring it to a 150 cc. conical flask, 100 cc. of "Modified Prollius' Fluid" was added to it. The flask was stoppered securely with a cork made impervious to ether. The smut spores were allowed to macerate in the fluid for twenty-four hours, shaking the flask vigorously at intervals. The next step, called the "shaking out process," was to pipette off 50 cc. of the clear supernatant solution; this was passed through a filter into a 250 cc. separatory funnel. The filter and funnel were washed with 5 cc. of ether which was allowed to enter the separatory funnel. The solution was acidified with equal parts of three per cent. sulphuric acid and water. By a rotary motion of the globular separatory funnel the aqueous portion of the solution was separated from the immiscible portions of the fluid. The aqueous or lower layer was then drawn off. The shaking out process was twice repeated, using very dilute sulphuric acid, one part of three per cent. acid to nine parts of water for the first washing and 10 cc. of water for the second. The several washings were collected in the same flask with the acid liquid first drawn off. The abstraction of the alkaloid was then considered practically completed.

To remove certain plant principles other than alkaloids which may have passed into the acid water, owing either to their solubility in water or to the fact that some ethereal liquid dissolves in water, the acid water solution was again returned to the separatory funnel, which in the mean-

¹² Modified Prollius' fluid.

Ether.....	250 cc.
Chloroform	100 cc.
Alcohol	25 cc.
28% ammonia.....	10 cc.

¹³ W. J. Sturmer and C. E. Vanderkleed, "Elementary Course in Quantitative Chemical Analysis." Compiled for students of Purdue School of Pharmacy. :61-64, 1898.

time had been thoroughly cleansed and 10 cc. of chloroform added. By rotating the funnel the chloroform, or lower layer, was soon separated from the aqueous solution and was drawn off and discarded. To remove the ammonium sulphate formed on acidifying the solution it was again treated to 10 cc. of chloroform and then enough 10 per cent. ammonia water was added to render the mixture slightly alkaline. The separator was again rotated for some time, after which the chloroformic layer was drawn off. The alkaloids are dissolved by the chloroform while the ammonium sulphate being insoluble in chloroform will remain in the aqueous layer. This washing with chloroform was twice repeated, each time using 10 cc. of the chloroform. The successive washings being collected and added to that of the first in the flask, if it is desired to recover the chloroform, or if not, in an evaporating dish. The latter method was followed, the solution being evaporated to dryness over a steam bath. The residue was treated with a 3 per cent. solution of sulphuric acid; this was filtered and the filtrate tested for alkaloids, as in the first two processes mentioned. The reactions obtained were as follows:

Reagent 1. A slight turbidity was obtained, which on standing for some time, deposited a dark brownish substance on the bottom of the glass.

Reagent 2. A marked cloudiness was obtained, which on standing for some time deposited a whitish crystalline precipitate on the bottom of the glass.

Reagent 3. No visible reaction, or any deposit after standing.

Reagent 4. No visible reaction, but on standing a slight deposit was noticed on the glass.

TESTS FOR ALKALOIDS IN COMMERCIAL EXTRACT OF ERGOT AND CORN SMUT.

The uniformity of the results obtained from the reagents employed, the first two giving positive and the last two negative tests, in each instance, led to an examination of the commercial extracts of both ergot and corn smut.

Ergot of Rye Test.—The commercial fluid extract of ergot was obtained from a leading wholesale druggist in the city, whose supply was obtained from the well-known firm of Parke, Davis & Co., of Detroit, Michigan. The fluid extract was evaporated to dryness over a steam bath, the residue treated with dilute sulphuric acid and filtered as in the preceding processes, and tests made with the reagents. The reactions obtained were as follows:

Reagent 1. A yellowish brown, curdy like precipitate was obtained.

Reagent 2. A cloudy white precipitate was obtained, which on standing deposited a purplish brown curdy like substance.

Reagent 3. A reddish brown precipitate was obtained.

Reagent 4. No reaction was obtained.

Corn Smut Ergot Test.—The material used was obtained from the same local druggist, who in turn received his supply from the well-known firm of Merrill & Co., Cincinnati, Ohio. The material was treated in the same way as in the preceding test, and the reactions obtained were somewhat similar.

Reagent 1. A precipitate was formed, but it was not so marked as in the ergot of rye.

Reagent 2. Reaction much the same as in that of rye ergot.

Reagent 3. Reaction not quite so marked as in the rye ergot.

Reagent 4. No reaction was obtained.

A brief summary of the work shows that a substance was obtained in all the extracts made which gave positive reactions with the first two reagents used, and negative ones with the last two.

Commercial extracts of rye ergot and of corn smut gave similar reactions to those obtained from the corn smut extract prepared in the laboratory in the case of reagents one and two, while they gave marked results in reagents three, from which negative results were obtained in all preceding trials.

PHYSIOLOGICAL EFFECT OF AN ALCOHOLIC EXTRACT UPON HORSES.

This portion of the work was carried on in connection with that of the tests for alkaloids. The alcoholic extract was made by the writer in the same manner as described in the preceding pages. The experimental work upon the horses was performed by Dr. R. A. Craig, of the Veterinary Department, who has kindly placed at my disposal the appended notes, upon the amounts and effects of the doses administered.

Horse No. 1.—A gelding, poor in flesh, but healthy, was given 15 cc. of the extract sub-cutaneously. The dose seemed to have no effect. The next day 30 cc. were given in the same way. In twenty-five minutes he stopped eating. The pulse and breathing were quickened and the peristaltic movement of the intestines was increased. Forty-five minutes after the drug was given, faeces were passed. No further effects were noted.

Horse No. 2.—A gelding in good condition was given 25 cc. of the extract sub-cutaneously. In twenty minutes he became restless, stopped eating, and the pulse and breathing were quickened. A moist evacuation of faeces occurred in twenty-five minutes. An hour after giving the injection its effects had passed off. Two days afterward 45 cc. were given. The horse soon became restless, the intestinal murmurings were loud and an evacuation of faeces soon followed. When made to turn in the stall his movements were slow and unsteady. One hour after giving the injection his pulse was sixty and his respirations forty-three per minute. He refused to eat and remained rather dull till noon the following day. After an interval of a few days the horse was given 130 cc. per os. In

forty minutes he stopped eating and his pulse and breathing were quickened. Outside of his refusing to eat, no other effects of the drug were noted.

Summary.—The sub-cutaneous injection of 25 to 30 cc. of the drug caused the animal to become restless and increased the peristaltic movements of the intestines. This was followed shortly by evacuation of the contents of the rectum. At the same time the pulse and respiration were quickened. The effects of the dose passed off in an hour.

The injection of 45 cc. produced in addition to the above symptoms, a dullness and an unsteady gait when made to move. The effects of the dose were much more lasting. The horse remained dull and refused to eat for twenty-four hours.

A 15 cc. sub-cutaneous injection and a 130 cc. per os dose produced but little effect.

While the results of both the chemical and physiological tests of the corn smut are at variance with those obtained by some other investigators¹⁴, they are in accordance with a number of chemists¹⁵, and to some extent in their physiological action to that obtained by Dr. Mitchell¹⁶, whose experiments were performed upon the frog. The concordance of the results obtained from both the chemical and physiological tests would indicate the presence in minute quantity of some narcotic in corn smut. What this narcotic is, and why, when corn smut is consumed in large quantities by farm animals, it does not produce more harmful results, are questions which are yet to be determined.

Moisture and Ash Determinations.—Determinations of the per cent. of moisture and ash contained in the smut spores were made in connection with the alkaloid examinations. The average of several moisture determinations was found to be 8.37 per cent., while that contained in some outdoor spores recently exposed to rains was found to be over 36 per cent. The average amount of ash as obtained from several ash determinations was 5.32 per cent. These results agree quite closely with those of Parsons¹⁷ and Kedzie¹⁸ on the per cent. of moisture, the former obtaining from 9-10 per cent., and the latter 8.30 per cent. In the ash determinations the results agree quite closely with those of Parsons, who found from 4.5 to 5 per cent. of ash.

¹⁴ Kedzie, Bull. Mich. Ex. Sta., No. 137:45, 1896.

Mayo, Bull. Kans. Ex. Sta., No. 58:69, 1896.

¹⁵ Dulong, Jour. de Pharm., 14:556, 1828.

Cressler, Amer. Jour. Pharm. for 1861:306.

Parsons, Rep. Dept. Agric. for 1880:136-138, 1881.

Hahn, Amer. Jour. Pharm., 53:495, 1881.

Rademaker and Fischer, Med. Herald for 1887:775.

¹⁶ Mitchell, Jas., The Physiological Action of *Ustilago Maidis* on the Nervous System. Inaug. Thesis, Univ. Pa., 1883. Therap. Gaz., Detroit, 10:223-227, 1886.

¹⁷ Parsons, H. B., Analysis of Corn Smut (in report of the chemist, Peter Collier), Rep. U. S. Dept. Agr. for 1880:136-133, 1882. Also in New Remedies, 11:80-12, 1882.

¹⁸ Kedzie, Dr. R. C., in Bulletin 137 of the Michigan Agr. Ex. Sta.:45, 1896.

A BACTERIAL DISEASE OF TOMATOES.

WILLIAM STUART.

During the winter of 1896-99, while engaged in an experimental study in the growing of tomatoes by the aid of chemical fertilizers, considerable annoyance was occasioned by the appearance of a disease which attacked the fruit and rendered them unmarketable. The disease was very similar to one noticed by Beach,¹⁰ while carrying on some experiments with tomatoes during the winter of 1896-97. Usually the fruit showed no sign of injury until two-thirds grown, and sometimes not until fully developed. (See Fig. 1.) The first visible appearance of the disease in infected fruits was in a slight watery discoloration of the tissue beneath the epidermis. As the disease progressed the affected portion assumed a darker color, followed by a gradual depression of the infected tissue, resembling in many respects that caused by the black rot, *Macrosporium solani*, but without any fruiting hyphae growing on the surface of the epidermis. It rarely wholly destroyed the fruit, but as a rule seemed to hasten its maturity. Generally the disease attacked the apical portion of the fruit, in a few instances, however, the central or basal portions would show the characteristic watery discolorations first.

A microscopic examination of diseased portions of the fruit gave no evidence of the presence of any parasitic fungus. The presence of a minute motile bacillus seemed, however, to be fairly constant in all the tissue examined.

Isolation of the Germ.—In the isolation of the germ two different methods



Fig. 1. From photograph showing development of plants when fruit showed first signs of infection.

¹⁰ Beach, N. Y. Exper. Sta. (Geneva) Bull. 125:305-306, July, 1897.

were employed. In one, sections of the diseased tissue were removed from the fruit with a flamed knife and transferred to agar and bouillon tubes, from which direct inoculation of the tubes were made, from the inner portions of the diseased tissue by means of a sterilized platinum wire.

The cultures obtained from both these methods were apparently similar; both contained a minute motile bacillus having the same appearance as that noted in the microscopical examination. The germ thus obtained was assumed at the time to be the same as that seen in the diseased fruit, but its after behavior did not in all respects bear this out.

Growth of the Germ on Agar.—The growth of the germ upon slightly acid slant agar was quite characteristic; it produced a vigorous growth with irregular outline all along the track of the needle.

The color of the growth upon agar was creamy white on the margins, becoming yellowish toward the center, and having a marked viscid surface.

Bouillon Cultures.—In bouillon tube cultures the germ made but slight growth.

Pasteur Solution.—Culture of the germ in the Pasteur sugar solution made a much more marked growth than in the same media without the sugar. No gas was formed in the fermentation tubes, containing the Pasteur sugar solution.

Starch Solution.—This solution was prepared by supplementing starch for the sugar in the Pasteur sugar solution. Growth in this media was rather slow, and quite unsatisfactory.

Inoculation Experiments.—On February 15 two tomatoes which had every appearance of being perfectly healthy were removed from the plants to an adjoining room. One of these was inoculated with a pure culture of the germ, by puncturing the epidermis with a sterilized platinum wire and with another transferring the germs from the tube to the interior of the fruit. The remaining fruit was merely infected by smearing the germ over the surface of the pistillate portion of the fruit. After inoculation both fruits were placed under a bell-jar. At the end of the second day the first fruit showed signs of infection; or portion of the cells adjacent to the opening made for the introduction of the germ were fast turning a dark color. In a week the greater portion of the tomato was diseased and was giving off an offensive odor. By March 1, or thirteen days after the time of infection, it was completely decomposed, while the one on which the infection material had been smeared showed no signs of infection.

In comparing the action of the disease upon the artificially inoculated fruit with that of one naturally infected, it will be noted that with the exception of the first appearance of the disease their action is entirely different. In the natural infected fruit there was no offensive odor, it

rarely affected the whole fruit and never caused a sloughing of the cell tissues as did the artificial infections. Further inoculations only more fully confirmed these observations. The wide difference in the action of the germ in the natural and artificially infected fruits may indicate that they were not the same, although looking so much alike, or may be explained by supposing that in the naturally infected fruits the epidermis not being broken, excludes all putrefactive bacteria, while in the artificial infections the puncturing of the surface of the fruit to admit the germ, provides the most favorable conditions for the entrance of putrefactive bacteria. The putrefactive bacteria feeding upon dead tissue, find a suitable media in the tissues destroyed by the action of the inoculated germ and thus the two acting in conjunction make the destruction of the fruit much more rapid and complete.

On March 2, two more healthy tomatoes about two-thirds grown, were removed from the vines and after photographing were inoculated as in the first instance, that is, the spores were introduced into the interior of one fruit and smeared over the outer surface of the other. Like those of the first experiment, the one having the infective material smeared on the outside remained sound, while the other soon showed signs of disease. The progress of the disease in the second experiment was, however, somewhat slower than that of the first. Eventually the whole fruit was affected and gave off the same offensive odor. On March 22 the two fruits were again photographed. Plate I, Fig. 1, represents them previous to inoculation, while Plate I, Fig. 2, the changed condition of the diseased fruit is shown.

In order to determine whether the same effects would be obtained by inoculating the fruit on the vine, a cluster of fruit containing four half to two-thirds grown tomatoes, was selected for experimentation. Two of the tomatoes were inoculated by introducing the germ into the tissues of the fruit with a sterilized needle. In order to note the effect of the injury from needle puncture the third fruit in the cluster was punctured with a sterilized needle while the fourth was reserved for a control. All inoculations were made on the north side of the fruit in order to avoid any action of the sun upon the wound. Three days later the tissues surrounding the infected portions of the first two fruits had begun to grow darker. From this time on the destruction of the tissues were quite rapid. No ill effects could be noted on the fruit punctured with the sterilized needle, both of the latter fruits remaining perfectly sound.

In addition to the above experiments, an attempt was made to infect the fruit in the earlier stages of its development by smearing some of the germs on the pistil of the flower. The results obtained from this line of experimentation were a complete failure, as but one blossom out of the several infected developed a fruit, and this did not grow to any size. It is quite probable that the presence of the infective material upon the stigma was in itself responsible for the non-pollination of the fruit.

SUMMARY.

A decay of green fruits on tomato plants grown in the greenhouse seemed from a microscopical examination to be of bacterial origin. The fruit showed patches that looked watery, became depressed, after a time turned blackish. Usually the disease started at the blossom end, but sometimes at other parts. No evidences of a fungus were present.

Attempts to separate a specific germ were apparently successful. Inoculation of green fruit by puncturing the epidermis and introducing the supposed germ of the disease from pure cultures in every instance produced a disease.

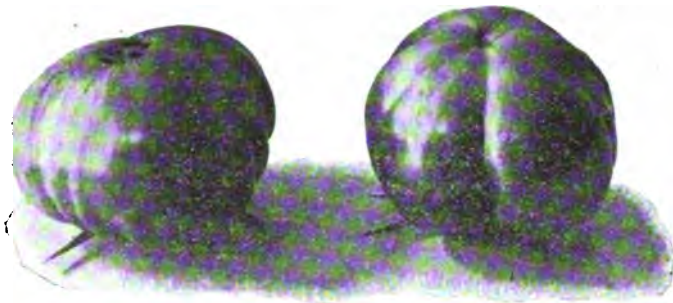
Applying the cultural material to the outer surface of the fruit gave negative results.

The disease induced by the germ from the culture did not correspond in some particulars with that from natural infection, and there is still doubt if the two be the same.

No preventive measures can be suggested with the limited knowledge of the disease yet available.

Purdue Univ. Agric. Exp. Station.

Plate I.

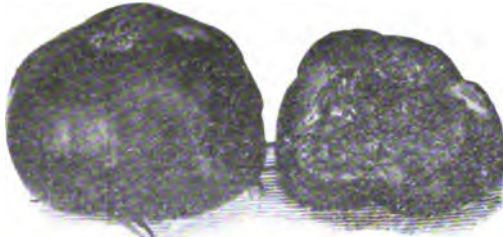


a.

FIG. 1.

b.

Two healthy tomatoes removed from the vine for artificial infection. Photographed prior to inoculation, March 2, 1899.



c.

FIG. 2.

d.

The same fruits as shown in Figure 1, twenty days after infection. Tomato a, infection material smeared over outer surface of the fruit not producing any results, as shown at c. Tomato b, infection material introduced into the tissues of the fruit, producing a breaking down of the tissues, as shown at d. Photographed March 22, 1899.

EPIDEMICS OF HOG CHOLERA AND SWINE PLAGUE.

A. W. BITTING, M. D., D. V. M.

In conducting a study upon the epidermis of hog cholera, the object has been to determine the manner of dissemination of the germs which cause such widespread epidemics and to determine, if possible, how far such means are within our control. Hog cholera and swine plague have been studied from the bacteriological and pathological standpoints in many laboratories, and this department has accepted the findings of these investigators, but has made no efforts to verify or to add to them. It has been the effort to see how far the deductions from the laboratory studies can be applied in a practical way in combating the disease. The observations upon which this paper is based cover a period of eight years from 1893 to 1900, inclusive.

Indiana has produced and lost the following number of hogs during the years given below in Table VI:

TABLE VI.
HOG PRODUCTION AND LOSS FROM DISEASE IN INDIANA FROM 1893-1900.

YEAR.	Produced.	Lost.	Per Cent. of Loss.
1893	3,365,462	288,286	8.6
1894	3,589,821	351,166	9.8
1895	3,906,818	326,555	9.9
1896	3,341,981	402,164	12
1897	4,313,940	512,692	7.5
1898	4,060,121	326,359	8
1899	3,689,739	372,868	10
1900	4,333,403	256,991	5.9
1895	2,890,797	278,143	9.3
1896	3,258,580	580,267	14.8
1897	3,638,535	899,457	24.7
1898	3,689,739	372,868	10.1
1899	3,456,342	553,930	16
1900	3,241,727	282,550	8.7

In a study of the epidemics of the disease, the query naturally arises, what keeps up the infection producing a loss of over \$2,000,000 annually? Why should there be a loss of 256,000 hogs in one year and 900,000 in another? Why are the herds in the western part of the State attacked in one year and those in the eastern part in a succeeding one? What are the constant and what are the variable factors? Unless these questions can be answered, we are not in a position to apply the knowledge gained in the laboratory to the prevention of the spread of this disease.

In order to obtain definite information as to the presence of the disease and the losses sustained in the State each year, the statistics of the number of hogs produced and the number that died in each township was obtained through the office of the State Statistician. These statistics are believed to be fairly accurate. There are 1,100 townships in the State, and thus the area of each is so small as to be a fairly good working unit. By such divisions, it is possible to study the relation of the disease to streams, elevations, the distribution of the rainfall, to railway lines, to the density of the swine population and to other factors that may appear to have an influence upon the distribution of the infection.

Hog cholera is a disease which closely resembles typhoid fever in the human subject. This resemblance is strong in the character of sickness, the nature of the lesions which are produced and in the nature and behavior of the germs.

Typhoid fever is a water-borne disease, and it is but natural that we might expect that hog cholera should show a similar relationship to the water supply. A study was made of the relation of the disease to the water supply, with the following results:

In 1895 the 60 townships bordering upon the Wabash River, from Cass County to its mouth, show a loss of 150 head out of every 1,000 produced; 47 townships in the second tier removed from the river show a loss of 100 head per 1,000, or 50 per cent. more loss in the first tier than in the second tier. In 1896 the bordering townships lost 294 hogs per 1,000, the second tier 205, and the third tier 160. In other words, the loss was 43.4 per cent. more in the first tier than in the second tier, and 83.8 per cent. more than in the third tier.

In 1895, 44 townships bordering upon the north fork of the White River lost 138 hogs per 1,000, and 42 townships in the second tier 65 hogs per 1,000, or 112 per cent. greater loss in the townships bordering upon the river than in those a few miles removed. In 1896 the loss in the first tier was 231 per 1,000, in the second tier 156, and in the third tier 75, or 48 per cent. greater loss in the first than in the second and 208 per cent. greater than in the third. In 1896, 44 townships bordering upon the south fork of the White River lost 200 hogs per 1,000; 58 townships in the second tier lost 150, and 42 townships in the third tier lost 100; thus making 33 per cent. more loss in the first than in the second, and 83 per cent. more loss than in the third. In 1897, the first tier of townships bordering upon the river lost 321 hogs per 1,000, the second tier 182, and the third tier 145; 76 per cent. greater loss in the first than in the second, and 121 per cent. more than in the third. During the same period a continuous correspondence was kept up with the breeders of pure bred swine, and it was found that about 90 per cent. of them lost no hogs, while their neighbors suffered severely. In nearly all cases they had used well water, while their neighbors had followed the common practice of using surface water. Doctors Salmon and Smith came to the following conclu-

sions as a result of their investigations: "Perhaps the most potent agents in the distribution of hog cholera are streams. They may become infected with the specific germ when sick animals are permitted to go into them, or when dead animals or any part of them are thrown into the water. They may even multiply when the water is contaminated with fecal discharges or other organic matter. Experiments in the laboratory have determined that the hog cholera bacilli may remain alive in water four months. Making all due allowance for external influences and competition with the bacteria in natural water, we are forced to assume that they may live at least a month in streams. This would be long enough to infect every herd along its course."

It is common practice throughout the State to give the hogs surface water in which to wallow and to drink. Small streams are dammed, drinking places are built into the rivers, a basin is scooped out to receive the water from a barnyard, open ditch, tile drain or spring. All of these afford the best conditions for introducing the germs into the herd. It is not uncommon to go along a public ditch or a stream during an epidemic and find the carcasses of hogs in every stage of decomposition, thus acting as the bearer of infection to new herds. The conditions are better now than ever before, but there are unscrupulous men who will take that means of disposing of their dead, and some one else must suffer.

Had the investigations ceased at this time, the conclusions could not have been otherwise than that it is water borne. If, however, we take the three succeeding years, 1898, 1899 and 1900, we can find no appreciable difference in the townships bordering on the river and in those more remote. In fact, the percentage is slightly higher in the remote townships. During this same period the number of hogs produced in the river townships remained about the same. Presumably the river contained the same infection, and we know that the swine breeders in general made no particular change in the management of their herds. Probably less than one-fourth of the animals remained on the farms more than ten months, so that new generations have come and gone. Had the animals recovered from an attack of the disease we might attribute this difference to an acquired immunity, but we are not aware that such immunity descends to succeeding generations. The disease has been observed to go up streams as well as down, to move to and from the streams, to attack herds supplied with deep well water and reasonable sanitary conditions as well as those under opposite conditions. The source of the water supply and the general management has remained constant, but the disease has changed locations. I can only conclude therefrom, that the water supply is only one means of dissemination of hog cholera.

In the recent studies upon typhoid fever it has been shown that in addition to the water supply, that flies may be bearers of infection. No such studies have been conducted with reference to the dissemination of hog cholera.

An attempt was made to determine whether a relationship could be traced to a difference in elevation. In other words, is the disease limited to the valleys? The most serious outbreaks have occurred in Knox and Posey counties, the lowest counties in the State, and Union County, the highest county in the State. Indiana is a comparatively level State, but such differences as do exist have no appreciable effect on the distribution of the malady.

An effort was also made to determine whether any relationship could be traced to the amount and distribution of the rainfall. Charts were plotted to show the rainfall for the year and for each month, but the results were of a negative character. In some seasons the disease was largely confined to the dry area and in others it followed the greatest rainfall of the summer and fall months. An attempt was also made to learn what relationship, if any, existed between the density of the swine population and the per cent. of loss. For this purpose the counties were grouped according to the number of hogs which they produced for each square mile, and the percentage of loss compared. These are shown in Table VII.

TABLE VII.

SWINE POPULATION AND PER CENT. OF LOSS IN INDIANA FROM HOG CHOLERA.

NUMBER OF HOGS PER SQUARE MILK.	1883-1890.	Per Cent. of Loss.	NUMBER OF HOGS PER SQUARE MILK.	1895-1900.	Per Cent. of Loss.
	Number of Counties.			Number of Counties.	
1-24.....	1	8.1	1-24.....	2	7.6
25-49.....	7	4.5	25-49.....	25	10.3
50-74.....	20	5.9	50-74.....	14	13
75-99.....	12	9.1	75-99.....	16	14.9
100-124.....	16	8.3	100-124.....	12	14.9
125-149.....	11	7.9	125-149.....	8	16.3
150-174.....	7	8.1	150-174.....	5	13.2
175-199.....	10	8.8	175-199.....	8	17.6
220-224.....	8	10	220-224.....	2	17

It was not possible to make the comparison by townships in this case, as the number of square miles in each township could not be ascertained. In the series of years from 1883 to 1890 there is very little difference in the per cent. of loss, as 12 counties having from 75 to 100 hogs per square mile, lost a slightly higher per cent. than ten counties having from 175 to 200 hogs per square mile. In the last series of years the loss increases with the increase of swine population. In this connection it must be borne in mind that the counties having the densest swine population are also situated along the streams.

The sections of the State which have been least affected by the disease are the two northern tiers of counties with the exception of St.

Joseph and Laporte, and the southern counties with the exception of those in the extreme southwest. These sections have not been entirely free, but the losses have been very light. The infected area is that drained by the Wabash River and its tributaries, and the north and south forks of the White River. St. Joseph and Laporte counties are at the head of the Kankakee River and are also partially drained by the St. Joseph River to the north. They do not produce more hogs than the counties east or south, and have no trunk lines or railroads not common to the adjacent counties, and yet they seem to have a permanent infection.

The disease was also studied with reference to season, and in this respect it is much like typhoid fever. It is present at all times, but is much more epidemic in character in the late summer and fall, and gradually subsides in the winter and spring. Because of this greater prevalence in the fall, many people have held the opinion that the disease is due to the feeding of green corn. Individuals in high positions have committed this error. In 1896, the Iowa Weather Bureau published a map showing the distribution of the disease in that State. It was found that the greatest losses were sustained in those counties where corn constituted an almost exclusive diet. The lowest death rate occurred in those counties where dairying was an important industry and milk was largely used as a food. This was accepted as confirmative evidence of the bad influence of a corn diet. In 1897 the statistics showed just the reverse condition, that is, corn-fed hogs suffered least.

The transportation companies are supposed to be responsible for the dissemination of the disease to a very large extent. It is against them that most sanitary officers would direct their first attack in the prevention of the disease. The point constantly urged as the panacea for this scourge is the compulsory disinfection of all cars. If the transportation companies are the offenders, which they are supposed to be, then we should be able to show repeated outbreaks along their right of way in which the evidence would point toward car infection. We can conceive that litter might drop from cars and fall into a stream and cause an outbreak of the disease some miles below and the scourge of infection never be accredited to the real source. For every such outbreak, however, there ought to be many along the right of way in which the evidence would be reasonably clear that it originated from car infection. We would expect that the disease would spread from the railroad to the country in some cases at least. The writer has made an investigation of every outbreak of railroad infection that has been brought to his attention, and in nearly every instance the outbreak was the result of shipping in stock hogs for feeding purposes. The hogs were either diseased before being shipped or infected from the yards or cars. Seventeen such outbreaks occurred in 1895, and 36 in 1896. During the entire eight years the writer has not found a dozen outbreaks of the disease independent of the shipment of stock, neither has he found the disease to be more prevalent along

trunk lines than at points more remote. These studies seem to indicate that the transportation companies are not such grievous offenders. If no hogs were permitted to be withdrawn from stock yards or shipped for feeding purposes, the danger from transportation infection would be largely reduced. The former could be done at very little expense, but the disinfection of all cars would involve an enormous outlay. In the writer's opinion, it will require stronger proof than that yet presented to justify an order for general disinfection of cars.

An attempt was also made to learn how long the germs may live on a premises and infect susceptible animals. The laboratory experiments which have been made would rather indicate that such infection could not continue for a long time, for not more than a few months or at most a couple of years. Field observations to determine the same points are always open to criticism because we can not guard all the means of infection. The evidence is only circumstantial. Repeated observations have shown that outbreaks of the disease have occurred on farms in from one to three years as the result of hogs rooting out the remains of former victims. The number of such cases reported within one year is quite large, after two years is small and after three years is rare. The writer witnessed an outbreak in which the infection seemed to have remained on premises for four years. An epidemic destroyed a herd that had occupied an abandoned house and some of the carcasses were never removed. The buildings were then closed and no stock had access to it or near it until it was again utilized by hogs four years later. A typical outbreak occurred, and as they were the only hogs affected in that vicinity, it seemed as though the infection had persisted. In another instance the period was seven years. The period during which typhoid may infect a well or anthrax a premises is only determined by circumstantial data upon such cases as will permit the elimination of other factors. If such observations may be accepted for those diseases, why not for hog cholera? If it be true that the germs may live for a year or more in the soil, we can then account for many outbreaks, the cause of which now seem obscure.

Against such observations as to the duration of the infection, we find hundreds of farmers will place bunches of hogs on premises where the diseased have just been removed and no bad results follow. Others will feed the carcasses of the dead to the living in order to produce an immunity. These diametrically opposite conditions are difficult to understand, with our present knowledge of the disease. Moreover, if the disease germs can live in the soil and produce an infection when a favorable opportunity presents itself, then we would expect infection on the same farms in succeeding years. It is the rule, however, that after a very severe scourge of cholera, that the premises will remain free for a few years. This observation is further verified by the fact that if in a township there is a light loss of from 10 to 20 per cent., the succeeding year

the loss will probably be from 30 to 40 per cent., or even more, but after a loss of from 40 to 70 per cent., the following year there will be scarcely any trace of the disease.

This is so universally true that with the series of charts of the distribution of this disease one can predict with considerable accuracy the movements of the disease for the following year. In any locality the herds that escape one year are particularly liable to attack the succeeding year, provided they are kept under conditions similar to the first. Farms on which no cholera has ever existed are less subject to infection than those on which the disease has once gained a foothold.

A study was also made of the relation of age, to the virulence of the infection. Hogs under five months suffer far more than those that are older. Probably not more than 50 per cent. of hogs between the age of five and eight months become affected or die and probably not more than 10 per cent. of those that are above eight months contract the disease when exposed. There are epidemics in which the infection is of such virulent character that a much higher per cent. will become affected. In outbreaks of swine plague a higher per cent. of old hogs die.

Studies were conducted upon some of the minor influences which would disseminate the disease, as exhibitions at fairs and public sales. These are more important factors than are generally supposed. The disease has been carried for long distances in this manner. The present law governing exhibitions of stock is very good in many respects, and during the time it was enforced it saved many times its cost. The disease sometimes occurs as a local epidemic, covering an area of from 20 to 35 square miles, in which practically every herd will be affected at one time, regardless of the sanitary conditions under which they have been kept. In these local epidemics the disease could not have been spread by river, transportation company, traffic or any other agency within police control. I have witnessed several such small outbreaks, two of which followed local showers and three occurred during a dry period. In such general outbreaks as occurred in 1896, it is impossible to account for the simultaneous appearance of the disease in distant localities and upon hundreds of farms in the same vicinity by any ordinary means of communication that is controllable.

One of the reasons for presenting the foregoing considerations upon hog cholera, is to assist in more clearly defining the true nature of the malady. There is an almost constant demand that States should exercise police power over this disease, the same as in glanders, Texas fever and other maladies. Those most earnest in their demands fail to recognize the difference between these diseases and the size of the problem. There are a few fundamental principles that must be recognized in determining what steps may be taken in exercising police control.

First. State control may be made a success with those diseases in which the causative agent requires close contact of susceptible animals

with infected animals or furnishings to spread the disease. It is against diseases of this class that State control is usually directed. Pleuro pneumonia of cattle belonged to this class and was stamped out. Glanders of horses is the best type that we now find. When a glandered horse is isolated or killed and the barn and harness cleaned, we know that no more cases will spring up from that source. Hog cholera does not belong to this class.

Second. State control may be made a success with those diseases in which the causative agent, while outside the body is conveyed by some controllable agent. Such diseases are typhoid fever in man, and Texas fever in cattle. Typhoid fever in cities is almost a thing of the past, where there is a good board of health. The disease germs are conveyed by the water and by securing a pure water supply it can be prevented. Texas fever germs are conveyed by the tick, and to prevent the spread of that disease all that is necessary is to guard against the tick. Hog cholera and swine plague do not belong to this class alone, as they are without doubt spread by many means. Moreover, the effort to secure pure water must be made by the owner.

Third. State control may be made successful with those diseases in which the germs may live outside of the body for an indefinite time and spread in numerous ways, if some means of immunization be known. The type of such disease in this State is black leg. By vaccination, the cattle in the infected sections may be rendered immune and the loss be reduced to only a very small percentage. Most heroic efforts have been made to secure a system of vaccination or inoculation for the prevention of swine disease. The efforts in this direction have been failures. There are still a few who make claims of success, but their methods can not be duplicated by others, with good results. The serum treatment for prevention and treatment, from which much was expected and which has been fairly successful in the hands of the government experts, does not promise to be a generally practicable measure. The attempts to duplicate the work by private firms have not been encouraging.

The method of immunizing in utero now so much advertised, has not been used long enough to determine its success or failure.

Fourth. State control may be made successful if a curative treatment be known. The best example of such a disease is sheep scab. The dipping of sheep and the proper quarantining of affected animals will effectually stamp out the trouble. No known specific has yet been discovered for hog cholera. This Station has used more than two tons of so-called cholera cures. The files at the patent office were scanned for every formula, numerous prescriptions were received and all the remedies offered on the market were tested. The results were negative and in this we agree with practically every investigator. The remedies now so much advertised will give way to others in a few years.

Fifth. State control can only be partially successful with those diseases in which the causative agent may live outside in the body for an in-

definite time and be carried from place to place by natural agencies and no means of immunization or cure be known. Influenza and strangles in horses and grip in people are types of this class. To know the cause of these diseases does not enable us to control them, further than the efforts of the individual can be exercised in keeping the body in a healthy state by care, food and good sanitary surroundings. In epidemics of swine plague we certainly have an analogous condition.

It is impossible to state definitely how much can be accomplished by police control. The experiments which have been conducted have been of short duration or over too small areas to draw a satisfactory conclusion. In practically all these attempts the reports have been favorable.

In the government experiments in Iowa in 1897, a canvass was made of all the farms to determine how many hogs were lost the year prior and as rapidly as the disease was reported hogs were killed and the premises cleaned. The results seemed to show that a considerable saving had been made by the end of the year. The figures upon the prevalence of the disease in any given locality in the State show that little reliance should be placed in the apparent results unless continued in the same place for several years. There might have been a considerable decrease had nothing been done.

Minnesota makes a more systematic effort to prevent the occurrence of hog cholera than any other State. The work is under the State Board of Health, and there is a general enforcement of quarantine measures against any infected premises and compulsory disinfection. The problem is simple there as compared with the conditions in our own State. The total loss for the whole State of Minnesota is less than in a single county here.

England has tried to stamp out the disease by slaughter and quarantine. No suspected hogs can be shipped from a swine fever district within 60 days from a reported outbreak. Every owner must report all cases at once to the district inspector. All cars must be disinfected after each trip. Prior to 1896 the work was not done under very rigid regulations.

TABLE VIII.

OCCURRENCE OF SWINE PLAGUE IN ENGLAND.

YEAR.	Outbreaks.	Number Slaughtered.
1894	5,682	56,296
1895	6,295	69,931
1896	5,166	79,286
1897	2,155	40,764
1898	2,514	43,756

The effect has been to greatly reduce the number of outbreaks and also the number of diseased hogs slaughtered. The disappointing thing is the fact that the infected area remains the same. In the estimation of many it is a question whether the saving in one direction is not offset by the expense of disinfection and annoyance to commerce. Five years hence we will be in a better position to estimate the full value of the work.

Indiana sustains an annual loss of over \$2,000,000 from these two diseases. They present unusual difficulties for their control and before any system can be recommended or adopted, a much more extensive series of experiments should be undertaken to determine the best method. A complete system of police control such as that employed in England would cost not less than \$250,000, an amount too large to be considered for one moment.

THE PREVALENCE OF SHEEP SCAB.

A. W. BITTING, M. D., D. V. M.

Sheep scab is one of the diseases for which there can be no excuse offered for allowing it to exist. It is probably the most easily and cheaply eradicated disease of farm animals. It is a truly parasitic affection and the parasites can live off the body of the host for only a short time. It can not be conveyed from one animal to another except by close contact with the affected animals or with the premises where affected animals have been, and it is a disease that can be completely stamped out by treatment. To allow the disease to exist at all is to make dipping a necessity, and this is often at a season of the year when it is attended by some loss and a great deal of labor and inconvenience. Could farmers only realize that it costs more to dip newly infected flocks each year because of neglect to dip, or imperfect dipping of scabby sheep, than it would to stamp out the disease, they might demand that the work be done thoroughly at one time.

In order to determine to what extent the disease prevails in this State, a request was made that the State Statistician should include the question among his inquiries. The results of the year 1898 were published in bulletin No. 80. The results for 1899 and 1900 are as follows:

TABLE IX.

THE OCCURRENCE OF SHEEP SCAB BY COUNTIES IN INDIANA IN 1899 AND 1900.

COUNTY.	1899.		1900.	
	Number of Reports.	Number Sheep Affected.	Number of Reports.	Number Sheep Affected.
Adams	3	169	2	3
Allen	3	11	5	119
Bartholomew	2	5	3	28
Benton	0	0	1	4
Blackford	0	0	1	74
Boone	5	204	5	161
Brown	0	0	1	79
Carroll	5	27	2	57
Cass	5	18	2	20
Clark	2	4	4	35
Clay	5	21	3	9
Clinton	5	188	6	122
Crawford	2	14	3	19
Daviess	2	12		
Dearborn	0	0	1	2
Decatur	0	0	3	9
Dekalb	2	35	1	1
Delaware	3	409	8	344
Dubois	6	39	6	44
Elkhart	6	121	5	284
Fayette	3	248	3	11
Floyd	1	3	1	10
Fountain	7	149	6	143
Franklin	8	361	5	241
Fulton	3	159	1	29
Gibson	5	35	2	6
Grant	8	404	2	12
Greene	2	4	2	9
Harrison	4	18	2	16
Hancock	5	372	7	340
Hamilton	6	595	4	88
Hendricks	8	280	5	416
Henry	2	71	5	26
Howard	5	49	5	17
Huntington	5	196	3	67
Jackson	3	22	4	35
Jasper	1	3	3	46
Jay	7	269	6	96
Jefferson	3	12	4	30
Jennings	5	23	7	39
Johnson	6	55	5	75
Knox	3	20	3	28
Kosciusko	3	36	4	72
Lagrange	3	240	0	0
Lake	0	0	1	1
Laporte	6	69	0	0
Lawrence	0	0	1	1
Madison	4	21	8	259
Marion	6	102	5	152
Marshall	3	5	3	145

TABLE IX—Continued.

COUNTY.	1899.		1900.	
	Number of Reports.	Number of Sheep Affected.	Number of Reports.	Number of Sheep Affected.
Martin	3	63	3	78
Miami	5	35	4	40
Monroe	6	36	1	116
Montgomery	8	798	8	859
Morgan	5	422	4	147
Newton	0	0	1	42
Noble	3	10	0	0
Ohio	0	0	1	34
Orange	5	33	2	21
Owen	4	20	3	30
Parke	3	205	4	40
Perry	1	3	3	23
Pike	4	27	4	57
Porter	3	22	2	53
Posey	3	11	2	20
Pulaski	1	2	0	0
Putnam	5	109	6	263
Randolph	6	38	3	20
Ripley	2	87	4	32
Rush	5	229	6	74
Scott	1	1	0	0
Shelby	2	22	3	10
Spencer	2	4	4	13
Starke	2	7	0	0
Stauben	2	5	1	3
St. Joseph	3	32	2	4
Sullivan	4	842	5	453
Switzerland	3	30	0	0
Tippecanoe	5	39	4	162
Tipton	2	269	1	200
Union	1	28	2	12
Vanderburgh	1	5	0	0
Vermillion	1	14	1	1
Vigo	2	13	2	7
Wabash	2	24	4	10
Warren	5	179	2	26
Warrick	6	21	0	0
Washington	3	9	1	2
Wayne	6	52	5	20
Wells	5	260	7	480
White	2	75	6	96
Whitley	4	73	1	4
Total	320	9,338	287	7,192

An inquiry addressed to the owners of these sheep showed that they had called a sheep scabby when it had a rough coat and not produced by the scab parasite. This was true for many reports of from one to five or six. In 1899 the report showed a total of 9,338 affected sheep. Our estimate was that there were about 7,500 head of true scabby sheep. This

year the report shows 7,192 scabby sheep, and our estimate based upon later correspondence, is that there are about 5,700 true cases. This is a fair decrease, but is not as large as it should be. There is less disease being spread now by shipment than formerly, as farmers have learned that the rules and regulations upon dipping at stock yards are very rigidly enforced and fewer affected animals are sent in.

Our own State laws are inadequate to handle the disease properly.

UPON THE OCCURRENCE OF RABIES.

A. W. BITTING, M. D., D. V. M.

In 1896 and 1898 an attempt was made to collect such data as would give a fair notion of the prevalence and comparative frequency of a number of the more important diseases. One of these diseases was hydrophobia. According to the reports received at that time there were about 12 genuine cases reported in the practice of 20 veterinarians for each year. In February of the present year a query was again directed to all the veterinarians in the State, and from their reports it is believed that the number of cases each year is about the same as shown in the former work. The newspapers frequently make reports upon the disease and so often they prove to be erroneous that many people, including physicians, do not believe that such a disease exists. People are rarely affected and the human physician has little opportunity to witness its effects. The veterinarian does occasionally see affected animals, but these, as a rule, do not exhibit all those terrifying characteristics so popularly described. The disease does occur with sufficient frequency to demand attention, but ought not to be treated from either the standpoint of the alarmist nor as a myth.

Two well defined outbreaks of rabies have occurred within the immediate vicinity of the Station, one in 1892, at which time three dogs and a number of sheep and hogs were affected. The second occurred in the summer of 1898, at which time two dogs, three horses, and three cows died. Shortly after this time five other animals were suspected of being diseased and were killed, but we had no opportunity of making an examination. On April 10 of the present year a fox terrier was received at the infirmary affected with the disease. The history and symptoms of the cases that occurred in 1898 were about as follows: In the latter part of June, the farm dog had a fight with a peddler's dog. The farm dog was naturally very lazy, but on July 12 he showed unusual activity and followed the farmer part of the day behind the plow. Once in a while he was noticed to snap at the farmer's legs, but not viciously, and no

notice was taken. On the 13th he was still more active, followed the plowing, and once or twice snapped so viciously as to attract attention. While the house was being swept he snapped so viciously at the broom that he had to be put out. On the 14th he became cross to the stock and was seen to bite two horses, and later became so cross that it was necessary to shoot him. One of the horses became sick on the 5th of August. He began by looking dull and stupid, with intervals of unusual sensitiveness to all surroundings. He was attracted by all noises, refused to eat more than a small amount, would stand and shake the head, champ the jaws, salivate and bite at other stock or at persons. At first he would obey the owner, but rapidly became violent, tried to tear down the stall, and was shot. The second horse became affected on August 31. He was observed to be nervous and restless, all the time apparently paying attention to something at a distance. The horse showed unusual viciousness toward other horses in adjoining stalls, but did not offer to injure the owner. He would stand and rub the nose against the manger until it was raw. The horse was led five miles to the University. The nervousness increased and the animal would be startled at the least noise. The horse ate and drank Friday and Saturday morning, but was unable to do so in the afternoon. Slight spasms of the neck muscles were observed about Saturday noon, and there were brief general convulsions in the afternoon. There was continued walking, viciousness developed to an extreme degree. The animal would sit on the haunches and paw at the ceiling, and would rush at the walls in a frantic manner. He would seize his legs with his teeth and take out large pieces of flesh. There were periods of paralysis of the muscles of the neck and chest so that breathing was accomplished with great difficulty. He died of convulsions during the night. The third horse soon became affected on the evening of September 1 and the case developed so rapidly that it was necessary to kill her on the next morning.

One cow became affected on August 20 and was shot on August 23; one died September 1; and another was shot September 12. These cattle were probably bitten on July 14, the date when the horses were known to have been bitten. The symptoms in the cattle developed less rapidly than in the horse. They were first observed to be nervous, to step from side to side in the stable, to suddenly cease chewing and to gaze in a fixed manner upon some object usually at considerable distance. They would eat and drink part of the time. The genesic instinct was intense. They would paw and bellow like the male. A pregnant heifer began straining and aborted. The eyes were wild and staring and saliva flowed from the mouth. In the effort to get out of the stall one animal inflicted a great deal of injury to herself. There was paralysis of the muscles of the neck and back, so that there was the same difficulty in swallowing and breathing as in the horse. Death came during a convulsion in the animal that was kept for observation.

In the dog we have the period of nervous excitation during which time the animal is alert and active; a period of madness, during which time he will attack anything and inflict self injury. During this period there will be intervals during which the animal will be perfectly quiet and apparently intently thinking. The animal becomes cross and will attack anything; will keep on the move and the genic instinct may amount to a nymphomania. The final stage is that of paralysis, when groups of muscles in different parts of the body are affected. The power of swallowing is lost. The lower jaw may be paralyzed, and respiration may be performed with the greatest difficulty. These different periods merge into one another so that they can not be separated by any well defined interval. The diseases with which hydrophobia are most often confounded in cattle are mad itch, due to impaction with dry feed, and basilar meningitis in horses and dogs. In all of these diseases the history and development of the symptoms are different and will so appear when closely observed.

FERTILIZER TESTS ON DIFFERENT VARIETIES OF TOMATOES.

JAMES TROOP.

During the season of 1890 a number of experiments with commercial fertilizers on tomatoes were carried on in the different parts of the State under the immediate supervision of the Station chemist. In this same connection a similar test was made on the Experiment Station grounds in connection with the work of the horticulturist. Some interesting results were obtained, although they were not so well marked in all cases, owing to the fact that the soil on the Experiment Station farm is naturally more fertile than that upon which the same experiments were tried in other portions of the State. The soil selected was a rather heavy, sandy loam, naturally underdrained and sloping slightly to the south. The plat occupied a space 162 by 99 feet, or 16,038 square feet. Twelve varieties were used in the experiment. The plants were all started from the seed in the greenhouse, except two varieties, which were started from cuttings, and a portion of these were transplanted once from the seed bed into pots before planting them out into the open ground. The others were not transplanted at all, but taken directly from the seed bed to the open ground. The varieties were planted in rows running east and west, while the fertilizer plants ran north and south, across the varieties as shown in the following diagram:

DIAGRAM SHOWING THE ARRANGEMENT OF THE PLATS.

VARIETIES.		FERTILIZER.									
		Plat X three rows.	Plat IX two rows.	Plat VIII two rows.	Plat VII two rows.	Plat VI two rows.	Plat V two rows.	Plat IV two rows.	Plat III two rows.	Plat II two rows.	Plat I three rows.
2	Matchless.....	{ No fertilizer. }									
2	Early Michigan.....	{ Muriate K., 1,942 grams. Azotin, 932 grams. Nitrate Na., 1,556 grams. Acid Phos., 1,556 grams. }									
1	Dwarf Champion.....	{ Muriate K., 971 grams. Azotin, 466 grams. Nitrate Na., 776 grams. Acid Phos., 776 grams. }									
2	Fordhook Early.....	{ Muriate K., 1,942 grams. Acid Phos., 1,556 grams. }									
2	Trophy.....	{ No fertilizer. }									
2	Beauty.....	{ Muriate K., 1,942 grams. Azotin, 932 grams. Nitrate Na., 1,556 grams. }									
2	Trucker's Favorite.....	{ Nitrate Na., 1,556 grams. Acid Phos., 1,556 grams. Azotin, 932 grams. }									
2	Stone.....	{ Nitrate Na., 1,556 grams. }									
2	Optimus.....	{ Azotin, 2,019 grams. }									
2	Honor Bright.....	{ No fertilizer. }									
2	Combination.....										
2	Mikado.....										
1	Stone. From cuttings.....										
1	Lorrillard. From cuttings.....										
2	Early Michigan. Not transplanted.....										
2	Beauty. Not transplanted.....										
1	Mikado. Not transplanted.....										
1	Optimus. Not transplanted.....										
2	Trophy. Not transplanted.....										
1	Trucker's Favorite. Not transplanted.....										
2	Honor Bright. Not transplanted.....										

South.

Tables X to XIX show the results obtained from the ten different plats, with and without fertilizers, each plat having the same varieties, and each plat consisting of two rows, excepting Nos. 1 and 10, which had three each. These tables give the kind and amount of fertilizer, number of plants per plat, number of pounds of fruit per plat, average number of pounds per plant, number of fruits per plat, average number of fruits per plant, and the number of rotten fruits per plat.

The first fruits were picked July 20, and the last on September 25. Much the larger part of the crop, however, was picked between August 1st and September 5th:

TABLE X.
THE INFLUENCE OF FERTILIZERS ON YIELDS OF TOMATOES.

PLAT I. No Fertilizer. VARIETY.	Number Plants per Plat.	Number Pounds Fruit per Plat.	Average Pounds Fruit per Plant.	Number Fruits per Plat.	Average Number Fruits per Plant.	Number Rotten Fruits per Plat.
Matchless.....	6	60	10	230	38 $\frac{1}{2}$	15
Early Michigan.....	6	55	9 $\frac{1}{2}$	240	40 $\frac{1}{2}$	12
Dwarf Champion.....	3	11	3 $\frac{2}{3}$	57	19	11
Fordhook Early.....	6	12	2	175	29 $\frac{1}{2}$	6
Trophy.....	6	64	10 $\frac{2}{3}$	242	40 $\frac{1}{2}$	10
Beauty.....	6	69	11 $\frac{1}{2}$	287	48	16
Trucker's Favorite.....	6	77	12 $\frac{1}{2}$	271	45 $\frac{1}{2}$	13
Stone.....	6	89	14 $\frac{1}{2}$	276	46	18
Optimus.....	6	89	14 $\frac{1}{2}$	390	65	22
Honor Bright.....	6	68	11 $\frac{1}{2}$	238	39 $\frac{1}{2}$	14
Combination.....	6	79	13 $\frac{1}{2}$	301	50 $\frac{1}{2}$	10
Mikado.....	6	82	13 $\frac{2}{3}$	199	33 $\frac{1}{3}$	20
Stone (from cuttings).....	3	34	11 $\frac{1}{3}$	112	37 $\frac{1}{3}$	9
Lorrillard (from cuttings).....	3	31	10 $\frac{2}{3}$	133	44 $\frac{1}{3}$	11
Early Mich., not transplanted..	6	84	14	447	74 $\frac{1}{2}$	9
Beauty, not transplanted.....	6	72	12	308	51 $\frac{1}{2}$	16
Mikado, not transplanted.....	3	47	15 $\frac{1}{2}$	104	34 $\frac{2}{3}$	24
Optimus, not transplanted.....	3	22	7 $\frac{1}{3}$	93	31	7
Trophy, not transplanted.....	6	63	10 $\frac{1}{2}$	217	36 $\frac{1}{2}$	25
Trucker's Fav., not transplanted	3	46	15 $\frac{1}{3}$	168	56	25
Honor Bright, not transplanted.	6	44	7 $\frac{2}{3}$	158	26 $\frac{2}{3}$	13
Totals.....	108	1,198	11 $\frac{1}{6}$	4,696	42 $\frac{1}{2}$	306

TABLE XI.
THE INFLUENCE OF FERTILIZERS ON YIELDS OF TOMATOES.

PLAT II.		Number Plants per Plat.	Number Pounds Fruit per Plat.	Average Pounds Fruit per Plant.	Number Fruits per Plat.	Average Number Fruits per Plant.	Number Rotten Fruits per Plat.
Muriate Potash	1,942 gr.						
Nitrate Soda	1,556 gr.						
Asotin	932 gr.						
Acid Phosphate	1,556 gr.						
VARIETY.							
Matchless		4	54	13½	223	55¾	23
Early Michigan		4	34	8½	205	51¼	14
Dwarf Champion		2	8	4	45	22½	3
Fordhook Early		4	22	5½	114	28½	3
Trophy		4	48	12	228	57	16
Beauty		4	43	10¾	169	42¼	21
Trucker's Favorite		4	41	10¼	180	45	17
Stone		4	43	10¾	165	41¼	9
Optimus		4	52	13	287	71¾	14
Honor Bright		4	40	10	184	46	6
Combination		4	51	12¾	263	65¾	9
Mikado		2	58	14½	153	38¼	22
Stone (from cuttings)		2	35	17½	108	54	11
Lorrillard (from cuttings)		2	27	13½	127	63½	7
Early Mich., not transplanted		4	51	12¾	261	65¼	12
Beauty, not transplanted		4	70	17½	236	59	12
Mikado, not transplanted		2	41	20½	117	58½	14
Optimus, not transplanted		2	33	16½	209	104½	12
Trophy, not transplanted		4	57	14¼	77	14¼	7
Trucker's Fav., not transplanted		2	42	21	153	76½	7
Honor Bright, not transplanted		3	27	9	104	26	5
Totals		72	877	12½	3,608	50½	245

TABLE XII.
THE INFLUENCE OF FERTILIZERS ON YIELDS OF TOMATOES.

PLAT III.		Number Plants per Plat.	Number Pounds Fruit per Plat.	Average Pounds Fruit per Plant.	Number Fruits per Plat.	Average Number Fruits per Plant.	Number Rotten Fruits per Plat.
Muriate Potash	9,719 gr.						
Nitrate Soda	776 gr.						
Asotin	466 gr.						
Acid Phosphate	776 gr.						
VARIETY.							
Matchless		4	36	9	134	33¾	12
Early Michigan		4	35	8¾	183	45¾	12
Dwarf Champion		2	10	5	60	30	6
Fordhook Early		4	24	6	119	29¾	1
Trophy		4	39	9¾	182	45½	1
Beauty		4	36	9	138	34½	19
Trucker's Favorite		4	50	12½	145	36¼	8
Stone		4	40	10	133	38¼	13
Optimus		4	47	11¾	211	52¾	13
Honor Bright		4	46	11¼	167	41¾	10
Combination		4	52	13	133	33¼	9
Mikado		4	55	13¾	144	36	16
Stone (from cuttings)		2	28	14	103	51½	5
Lorrillard (from cuttings)		2	25	12½	89	44½	2
Early Mich., not transplanted		4	42	10¾	206	51½	18
Beauty, not transplanted		4	59	14¾	266	66½	7
Mikado, not transplanted		2	36	18	133	66½	16
Optimus, not transplanted		2	44	22	237	118½	8
Trophy, not transplanted		4	45	11¼	221	55¼	8
Trucker's Fav., not transplanted		2	35	17½	118	59	12
Honor Bright, not transplanted		4	45	11¼	199	49¾	27
Totals		72	829	11¼	3,321	48½	223

TABLE XIII.

THE INFLUENCE OF FERTILIZERS ON YIELDS OF TOMATOES.

PLAT IV. Muriate Potash 1.942 gr. Acid Phosphate 1.556 gr. VARIETY.	Number Plants per Plat.	Number Pounds Fruit per Plat.	Average Pounds Fruit per Plant.	Number Fruits per Plat.	Average Number Fruits per Plant.	Number Rotten Fruits per Plat.
Matchless	4	51	12¾	200	50	18
Early Michigan	4	41	10¼	200	50	11
Dwarf Champion	2	11	5½	51	25½	8
Fordhook Early	4	27	6¾	130	32½	15
Trophy	4	53	13¾	228	57	21
Beauty	4	52	13	194	48½	8
Trucker's Favorite	4	54	13½	115	28¾	13
Stone	4	59	14¾	193	48¼	18
Optimus	4	53	13¾	268	67	11
Honor Bright	4	45	11¼	168	42	6
Combination	4	56	14	198	49½	9
Mikado	2	40	15½	136	34	17
Stone (from cuttings)	2	22	20	145	72½	9
Lorrillard (from cuttings)	2	22	11	97	48¾	7
Early Mich., not transplanted	4	50	12½	212	53	6
Beauty, not transplanted	4	54	13½	240	60	11
Mikado, not transplanted	2	29	14½	78	39	5
Optimus, not transplanted	2	27	13½	141	70½	1
Trophy, not transplanted	4	47	11¾	171	42¾	5
Trucker's Fav., not transplanted	2	29	12¾	147	73	7
Honor Bright, not transplanted	4	50	12¾	204	51	17
Totals	72	918	12¾	3,516	50	223

TABLE XIV.

THE INFLUENCE OF FERTILIZERS ON YIELDS OF TOMATOES.

PLAT V. No Fertilizer. VARIETY.	Number Plants per Plat.	Number Pounds Fruit per Plat.	Average Pounds Fruit per Plant.	Number Fruits per Plat.	Average Number Fruits per Plant.	Number Rotten Fruits per Plat.
Matchless	4	30	7½	155	38¾	8
Early Michigan	4	40	10	209	52¼	13
Dwarf Champion	2	16	8	69	31½	2
Fordhook Early	4	27	6¾	125	31¼	27
Trophy	4	43	10¾	141	35¼	7
Beauty	4	46	11¼	180	45	9
Trucker's Favorite	4	46	11½	157	39½	20
Stone	4	45	11½	149	37½	12
Optimus	4	40	10	165	41¼	9
Honor Bright	4	46	11½	176	44	5
Combination	4	44	11	184	46	7
Mikado	4	49	12¼	130	32½	10
Stone (from cuttings)	2	27	13½	76	38	6
Lorrillard (from cuttings)	2	18	9	85	42¼	8
Early Mich., not transplanted	4	33	8¼	169	42¼	7
Beauty, not transplanted	4	31	7¾	128	32	1
Mikado, not transplanted	2	22	11	57	28½	8
Optimus, not transplanted	2	28	14	155	77½	2
Trophy, not transplanted	4	31	7¾	153	38¼	4
Trucker's Fav., not transplanted	2	22	11	129	64½	9
Honor Bright, not transplanted	4	31	7¾	123	30¾	9
Totals	72	715	9 9	2,915	41.5	183

TABLE XV.
THE INFLUENCE OF FERTILIZERS ON YIELDS OF TOMATOES.

PLAT VI. Muriate Potash 1,942 gr. Nitrate Soda 1,556 gr. Azotin 933 gr. VARIETY.	Number Plants per Plat.	Number Pounds Fruit per Plat.	Average Pounds Fruit per Plant.	Number Fruits per Plat.	Average Number Fruits per Plant.	Number Rotten Fruits per Plat.
Matchless	4	34	8½	126	31½	9
Early Michigan	4	51	12¾	203	50¾	4
Dwarf Champion	2	13	6½	48	24	7
Fordhook Early	4	33	8¼	171	42¾	9
Trophy	4	43	10¾	162	40½	11
Beauty	4	41	10¼	163	40¾	21
Trucker's Favorite	4	45	11½	168	42	14
Stone	4	42	10½	124	31	8
Optimus	4	39	9¾	189	47½	8
Honor Bright	4	39	9¾	151	37¾	8
Combination	4	43	10¾	181	45½	21
Mikado	4	58	14½	102	35½	0
Stone (from cuttings)	2	23	11½	82	41	3
Lorrillard (from cuttings)	2	23	11½	101	50½	1
Early Mich., not transplanted	4	35	8¾	181	45½	6
Beauty, not transplanted	4	45	11½	170	42½	16
Mikado, not transplanted	2	26	13	77	38½	5
Optimus, not transplanted	2	21	10½	108	54	6
Trophy, not transplanted	4	35	8¾	112	28	5
Trucker's Fav., not transplanted	2	25	12½	96	48	5
Honor Bright, not transplanted	4	20	5	77	19¼	6
Totals	72	734	10¼	2,792	40	163

TABLE XVI.
THE INFLUENCE OF FERTILIZERS ON YIELDS OF TOMATOES.

PLAT VII. Nitrate of Soda 1,556 gr. Azotin 933 gr. Acid phosphate 1,556 gr. VARIETY.	Number Plants per Plat.	Number Pounds Fruit per Plat.	Average Pounds Fruit per Plant.	Number Fruits per Plat.	Average Number Fruits per Plant.	Number Rotten Fruits per Plat.
Matchless	4	36	9	146	39	4
Early Michigan	4	37	9¼	183	45¾	14
Dwarf Champion	2	20	10	97	48½	2
Fordhook Early	4	21	5	106	26½	3
Trophy	4	39	9¾	116	29	7
Beauty	4	35	8¾	127	31¾	9
Trucker's Favorite	4	38	9½	135	33¾	9
Stone	4	32	8	102	25½	11
Optimus	4	40	10	170	42½	9
Honor Bright	4	37	9¼	122	30¾	3
Combination	4	44	11	155	38¾	10
Mikado	4	39	14¾	99	24¾	10
Stone (from cuttings)	2	24	12	79	39½	1
Lorrillard (from cuttings)	2	22	11	140	70	14
Early Mich., not transplanted	4	33	8¼	169	42½	0
Beauty, not transplanted	4	49	12¾	243	60¾	7
Mikado, not transplanted	2	23	11½	98	49	6
Optimus, not transplanted	2	12	12	53	26½	2
Trophy, not transplanted	4	33	8¾	109	27½	2
Trucker's Fav., not transplanted	2	14	7	70	35	3
Honor Bright, not transplanted	4	44	11	94	23½	2
Totals	72	672	9.9	2,613	38	128

TABLE XVII.

THE INFLUENCE OF FERTILIZERS ON YIELDS OF TOMATOES.

PLAT VIII. Nitrate Soda .....1,556 gr. VARIETY.	Number Plants per Plat.	Number Pounds Fruit per Plat.	Average Pounds Fruit per Plant.	Number Fruits per Plat.	Average Number Fruits per Plant.	Number Rotten Fruits per Plat.
Matchless	4	50	12½	119	29¾	23
Early Michigan	4	32	9	161	40¼	3
Dwarf Champion	2	12	6	64	32	5
Fordhook Early	4	23	5¾	95	23¾	3
Trophy	4	46	11½	108	26¾	12
Beauty	4	42	10½	143	35¾	16
Trucker's Favorite	4	44	11	145	36¼	20
Stone	4	44	11	118	29½	10
Optimus	4	59	14¾	211	52¾	8
Honor Bright	4	47	11¾	158	39½	7
Combination	4	57	14¼	231	57¾	7
Mikado	4	53	13¾	109	27¼	14
Stone (from cuttings)	2	27	13½	69	34½	6
Lorrillard (from cuttings)	2	27	13½	105	52½	5
Early Mich., not transplanted	4	40	10	252	63	3
Beauty, not transplanted	4	51	12¾	207	51¾	8
Mikado, not transplanted	2	25	12½	66	33	2
Optimus, not transplanted	2	25	12½	48	24	0
Trophy, not transplanted	4	33	8¼	127	31¾	3
Trucker's Fav., not transplanted	2	28	11½	116	58	3
Honor Bright, not transplanted	4	37	9¼	138	34¾	7
Totals	72	797	11.25	2,768	38.8	165

TABLE XVIII.

THE INFLUENCE OF FERTILIZERS ON YIELDS OF TOMATOES.

PLAT IX. Azotin .....2,019 gr. VARIETY.	Number Plants per Plat.	Number Pounds Fruit per Plat.	Average Pounds Fruit per Plant.	Number Fruits per Plat.	Average Number Fruits per Plant.	Number Rotten Fruits per Plat.
Matchless	4	43	10¾	145	36¼	13
Early Michigan	4	35	8¾	153	38¼	9
Dwarf Champion	2	15	7½	61	30¼	4
Fordhook Early	4	23	5¾	87	41¾	8
Trophy	4	39	9¾	127	31¾	10
Beauty	4	43	10¾	154	38½	12
Trucker's Favorite	4	53	13¼	172	43	19
Stone	4	43	10¾	133	33¼	14
Optimus	4	59	14¾	251	62¾	5
Honor Bright	4	58	14½	212	53	7
Combination	4	70	17½	329	82¼	14
Mikado	4	60	15	146	36½	28
Stone (from cuttings)	2	27	13½	91	45¼	3
Lorrillard (from cuttings)	2	25	12½	124	62	1
Early Mich., not transplanted	4	29	7¼	179	44¾	8
Beauty, not transplanted	4	51	12¾	221	55¼	7
Mikado, not transplanted	2	38	19	93	46¾	8
Optimus, not transplanted	2	35	17½	67	33½	4
Trophy, not transplanted	4	45	11¼	171	42¾	2
Trucker's Fav., not transplanted	2	28	14	139	69	13
Honor Bright, not transplanted	4	33	8¼	126	31½	10
Totals	72	850	12.25	3,181	45.66	199

TABLE XIX.

THE INFLUENCE OF FERTILIZERS ON YIELDS OF TOMATOES.

PLAT X. No Fertilizers. VARIETY.	Number Plants per Plat.	Number Pounds Fruit per Plat.	Average Pounds Fruit per Plant.	Number Fruits per Plat.	Average Number Fruits per Plant.	Number Rotten Fruits per Plat.
Matchless	6	59	9 $\frac{1}{2}$	230	38 $\frac{1}{2}$	4
Early Michigan	6	54	9	302	50 $\frac{1}{2}$	6
Dwarf Champion	3	23	7 $\frac{3}{4}$	66	22	4
Fordhook Early	6	25	5 $\frac{1}{2}$	185	30 $\frac{1}{2}$	6
Trophy	6	60	10	263	43 $\frac{1}{2}$	7
Beauty	6	60	10	234	39	3
Trucker's Favorite	6	80	13 $\frac{1}{2}$	304	50 $\frac{1}{2}$	8
Stone	6	69	11 $\frac{1}{2}$	195	32 $\frac{1}{2}$	3
Optimus	6	90	15	365	60 $\frac{1}{2}$	8
Honor Bright	6	85	14 $\frac{1}{2}$	243	40 $\frac{1}{2}$	5
Combination	6	99	16 $\frac{1}{2}$	369	61 $\frac{1}{2}$	9
Mikado	6	91	15 $\frac{1}{2}$	203	33 $\frac{1}{2}$	10
Stone (from cuttings)	3	39	13	159	53	5
Lorrillard (from cuttings)	3	39	13	201	67	4
Early Mich., not transplanted	6	51	8 $\frac{1}{2}$	488	81 $\frac{1}{2}$	7
Beauty, not transplanted	6	72	12	342	57	4
Mikado, not transplanted	3	59	19 $\frac{1}{2}$	178	59 $\frac{1}{2}$	5
Optimus, not transplanted	3	45	15	140	46 $\frac{1}{2}$	8
Trophy, not transplanted	6	67	11 $\frac{1}{2}$	233	38 $\frac{1}{2}$	6
Trucker's Fav., not transplanted	3	47	15 $\frac{1}{2}$	229	76 $\frac{1}{2}$	8
Honor Bright, not transplanted	6	51	8 $\frac{1}{2}$	274	45 $\frac{1}{2}$	4
Totals	108	1,271	11.76	5,403	49	124

A comparison of total yields of the different plats after reducing to the same number of rows, as affected by the various combinations of fertilizers, and those having no fertilizers, is given below, plat 3 receiving just one-half as much fertilizer as plat 2:

TABLE XX.

SUMMARY OF TOMATO FERTILIZER RESULTS.

Number Plat.	FERTILIZER USED.	Total Yield Plat. Pounds.
1.....	None	799
2.....	Muriate potash, nitrate soda, azotin, acid phosphate	877
3.....	Muriate potash, nitrate soda, azotin, acid phosphate	829
4.....	Muriate potash, acid phosphate	918
5.....	None	715
6.....	Muriate potash, nitrate soda, azotin	734
7.....	Nitrate soda, azotin, acid phosphate	672
8.....	Nitrate soda	797
9.....	Azotin	850
10.....	No fertilizer	847

TRANSPLANTING VS. NON-TRANSPLANTING.

JAMES TROOP.

As will be seen by referring to the previous tables, the following varieties were duplicated, one set was transplanted and the other planted directly from the seed bed, viz.: Early Michigan, Beauty, Mikado, Optimus, Trophy, Trucker's Favorite, and Honor Bright. Contrary to the general opinion held among gardeners, when we sum up the general averages of yields per plant of all varieties, we find that those which were not transplanted were ahead of the others, and the result stands thus:

TABLE XXI.

TABLE SHOWING AVERAGE YIELD OF VARIETIES, TRANSPLANTED AND NOT TRANSPLANTED.

VARIETY.	Transplanted.	Not Transplanted.
Early Michigan	9.87 lbs.	11.07 lbs.
Beauty	11.02 lbs.	11.95 lbs.
Mikado	14.04 lbs.	17.28 lbs.
Optimus	12.83 lbs.	14.1 lbs.
Trophy	11.1 lbs.	10.43 lbs.
Trucker's Favorite	11.97 lbs.	14.13 lbs.
Honor Bright	11.5 lbs.	9 lbs.

CUTTINGS VS. TRANSPLANTED PLANTS.

JAMES TROOP.

Cuttings were taken from plants of the Stone variety which had already borne a heavy crop in the greenhouse, and after having rooted, were planted under the same conditions as the transplanted plants raised from seed, with the following result:

Stone from cutting..... 15 lbs. per plant.
 Stone from seed..... 11.32 lbs. per plant.

A difference in favor of cutting of 3.68 per plant.

FERTILIZER EXPERIMENTS WITH TOMATOES IN GREENHOUSE.

JAMES TROOP.

The Stone variety was used for this experiment. The plants were transplanted once before being planted into permanent quarters in the greenhouse. They occupied the center bed, so that they received practically the same amount of sunlight and heat. They were transplanted September 25, and the first ripe fruit was picked December 16. The following table gives the plats, the kind and amount of fertilizer which each plant contained, and the weight of the fruit which each fertilized plat produced:

TABLE XXII.

FERTILIZERS ON TOMATOES IN GREENHOUSE.

Plat.	FERTILIZERS USED.	WEIGHT OF FRUIT.	
		Pounds.	Ounces.
1	{ Muriate K., 100 grams..... Nitrate Na., 80 grams..... Tankage, 50 grams..... Acid phosphate, 80 grams..... }	51	...
2	Check.		
3	{ Muriate K., 100 grams..... Nitrate Na., 80 grams..... }	50	6
4	Check.		
5	{ Muriate K., 100 grams..... Acid phosphate..... }	47	10
6	Check.		
7	{ Muriate K., 100 grams..... Nitrate Na., 80 grams..... Tankage, 80 grams..... }	53	...
8	Check.		
9	{ Nitrate Na., 80 grams..... Acid phosphate, 80 grams..... Tankage, 50 grams..... }	55	14

SUB VS. SURFACE IRRIGATION OF TOMATOES IN THE GREENHOUSE.

JAMES TROOP.

This was a repetition of a similar experiment along this line given in last year's report from this department. The sub-irrigated bed was lined with zinc and a layer of soft bricks for soil. Water was applied from below. The surface-irrigated bed was five inches deep, filled with soil, and watered entirely from the surface.

The results obtained from this test during the winter of 1899 were slightly in favor of the surface irrigation, so far as number of fruits and weight were concerned, but the fruits from the sub-irrigated plat were much larger and finer in every way. The results of the present season's tests are given below. They show a decided gain in weight of fruit from the sub-irrigated plat, although the surface-irrigated plants produced the greatest number of fruits.

TABLE XXIII.

SHOWING YIELD OF SUB VS. SURFACE IRRIGATION.

	Number Fruits.	Weight of Fruit.		Average Weight Per Fruit.
		lbs.	ozs.	
Sub-irrigated.....	389	82	8	3.39 ozs.
Surface-irrigated.....	399	71	12	2.88 ozs.

VARIATION IN INDIVIDUAL PLANTS.

JAMES TROOP.

It often happens that a single plant in a series of tests like the above, will influence the yield to a considerable extent, so that the true difference produced by a different combination of fertilizers is not always apparent. In order to test the amount of variation in individual plants, 14 plants were selected from a lot that were as nearly uniform in size and vigor of growth as possible, and these were planted in the greenhouse and

treated exactly alike so far as it was possible to do so. The results of these tests gave a maximum variation in number of fruits produced by each plant of 75 per cent. Some individual plants produced nothing but small fruits throughout the season. The maximum variation in the weight of fruit produced by each plant was only one and one-fourth pounds. This emphasizes the importance of selecting the very best individual plants from which to obtain seed.

LOCATION OF SAN JOSE SCALE IN INDIANA.

JAMES TROOP.

A part of the duties of the horticulturist has been to investigate the ravages of the San Jose scale in the orchards and nurseries of the State. The inspection of nurseries has for the most part been done by assistants appointed for that purpose, but the investigation of orchards has very largely been done in person. Previous to 1899 the San Jose scale had been found in nine counties in this State. Since that time eight more have been found to be infested, making seventeen counties that have been more or less infested. These are Laporte, Lagrange, Dekalb, Miami, Howard, Wayne, Marion, Morgan, Jefferson, Washington, Clark, Gibson, Vigo, Clay, Vanderburg, Perry and Switzerland. Of these, Laporte, Lagrange, Dekalb, Morgan, Howard and Switzerland are apparently free from the scale at the present time, owing to the persistent efforts of the owners of the infested orchards in following instructions given to destroy all badly infested trees, and to freely use the spray pump on the others.

Judging from our present knowledge of the situation, the worst infested localities are found in the city of Indianapolis, near the city of Evansville, and on the "Knobs" in Washington and Clark counties.

SWAMP MUCK.

H. A. HUSTON AND A. H. BRYAN.

In many parts of Indiana muck beds are found which vary in area from a fraction of an acre to over 5,000 acres. The formation of these beds is due to the growth and decay of aquatic plants. Where the plants fall down and are covered with water, only a portion of the organic matter is lost, and the remainder forms layers of organic matter which is preserved by the action of the water, and is commonly known as muck. The

material commonly called peat is derived from mosses which grow in wet places. The lower part of the mosses decay and gradually pass into what is known as peat.

Muck and peat soils are exceedingly fertile, and when properly drained form our best corn lands. They are also used to some extent for celery and onions.

It often happens that muck lands that have been laid with tile in the usual manner are not productive. The trouble is generally with the drainage. On a very limited area the trouble may be due to the presence of iron compounds. The improvement of unproductive muck lands has been discussed in bulletin 57 of this Station.

A muck bed is a valuable adjunct to a farm. Not only may very profitable crops be raised upon it when properly drained, but the muck itself may be used as a manure for the less fertile portions of the farm. The chief manuring ingredient in it is nitrogen. Different samples show from one-half to three per cent. of nitrogen in the air dry material. The other fertilizing ingredients are usually present in smaller amounts. The muck may be applied directly to the land, but the better method is to use it as an absorbent for liquid manures. Its high capacity for holding water makes it very useful for this purpose, and it will also fix the ammonia formed in the decomposition of the manure. Raw muck does not decompose very rapidly, but when mixed with manure the fermentation of the manure extends to the muck and renders its plant food much more readily available. When it is desirable to use it directly on the land without mixing with manure its texture can be much improved by exposing it in piles to the freezing and thawing action during the winter.

Many of the Indiana muck beds are underlaid with a bed of marl which is composed mainly of carbonate of lime, and to this reference will be made in another article. Mucks vary so much in composition that no average composition can be given which would serve as an approximate standard for reference.

Such Indiana mucks as have been examined are of high quality. Since mucks have such a high capacity for holding moisture it is best to make comparisons on the material from which all moisture has been removed, or what is known as the water free basis.

The three following Indiana muck soils have been under cultivation about twenty years and have been continuously in corn. The land produces about seventy bushels of corn per acre.

The portion included in the soil is the part turned by the plow and is the top six inches. The land gradually compacts and each year the plow turns up one-quarter to one-half inch of the subsoil that has not been previously disturbed. The subsoil included the black muck between the soil layer and the point where the raw muck of brown color was found. The average thickness of this black subsoil was about twenty inches.

NITROGEN IN WATER-FREE MUCK.

Soil No. 1.....	3.61 per cent.
Subsoil No. 1.....	2.75 per cent.
Soil No. 2.....	4.00 per cent.
Subsoil No. 2.....	4.14 per cent.
Soil No. 3.....	3.83 per cent.
Subsoil No. 3.....	3.38 per cent.

These mucks when fully dry contained about one-half mineral matter and one-half decayed vegetable matter. The vegetable matter was in such an advanced state of decay that about one-half of it could be extracted as humus. The muck treated of above was derived from water plants and not from peat moss, and it is difficult to find pure peat in Indiana.

For purposes of comparison samples of muck and pure peat moss in an advanced state of decay were procured in Maine. The muck had been used for a meadow and a hay crop had been removed every year for about 175 years. The mineral matter was about the same in amount as in the Indiana mucks. The peat contained only one and three-quarters per cent. of mineral matter.

NITROGEN IN WATER-FREE MUCK AND PEAT FROM MAINE.

Muck soil.....	1.75 per cent.
Muck subsoil.....	1.83 per cent.
Peat	0.67 per cent.

The peat contains less nitrogen than the average peat from New England.

It will be seen that the dry Indiana muck contains a high per cent. of nitrogen, nearly double the amount of nitrogen contained in the average commercial fertilizer. Many inquiries have been received asking if muck could not be put on the market as a commercial fertilizer. In my opinion it will be found much more suitable for use as an absorbent and an addition to manure. While the nitrogen content of muck is high, the nitrogen is not in a very available form and the fermentation caused by mixing it with manure is the best way of making the nitrogen more available. Commercial fertilizers are usually compounded on the basis of containing much more phosphoric acid than nitrogen. Water-free muck seldom contains as much as one per cent. of phosphoric acid, and this is not in a very available form. If muck were to be mixed with acid phosphate the fermentation necessary to make the nitrogen available would not take place. If the muck were used alone as a fertilizer it would contain such small quantities of phosphoric acid and potash that it would have to be rated among commercial fertilizers as a very low grade and slowly avail-

able nitrogenous goods, and the amount of plant food contained in a ton of it could be purchased in a more concentrated form at less than it would cost to dig, dry, grind and sack the muck.

There is doubtless a good field for the more complete utilization of the great stores of plant food contained in our muck beds, but the muck should be handled on the basis of coarse manure and not as a commercial fertilizer.

MARLS.

H. A. HUSTON, W. J. JONES AND A. H. BRYAN.

The term marl, as usually defined, refers to a mixture of amorphous carbonate of lime with varying proportions of sand and clay. The carbonate of lime is properly the characteristic ingredient. In common usage the word has been applied to very different kinds of material in different sections of the country. Materials which look like marl, or occur in beds located like marl, but which contain no carbonate of lime, are in some sections called marl. In other places beds of very pure carbonate of lime are found. Ordinary marls should not be confused with the noted green sand marls of New Jersey, which contain notable quantities of phosphoric acid and potash, and, before the advent of commercial fertilizers at reasonable prices, were extensively used as a source of these substances. Even the green sand marl is not of high enough grade to justify shipment to any considerable distance.

The Indiana marls contain high percentage of carbonate of lime. They are practically free from phosphoric acid and contain much less potash than ordinary soil. The marl beds are found under beds of muck, which vary in thickness from a foot to fifteen feet or more. The marl is sometimes mixed with some organic matter of the same general character as the muck.

The agricultural value of the Indiana marls depends on the carbonate of lime present. The nitrogen present seldom exceeds one-half of one per cent., and can not be considered as available until the marl has been frozen and disintegrated, and the nitrogen changed in form by soil organisms.

Ten Indiana marls showed the following range in composition:

Moisture	0.34 to 0.80 per cent.
Organic matter.....	3.25 to 6.63 per cent.
Standard insoluble.....	0.44 to 3.30 per cent.
Carbonate of lime.....	85.68 to 92.74 per cent.
Magnesia	0.98 to 1.76 per cent.
Sulphur trioxide.....	0.70 to 1.02 per cent.
Iron and alumina.....	0.46 to 1.64 per cent.

It will be seen that carbonate of lime is the only ingredient present in large amount. The marls pulverize very readily and their location near much of the light sandy soil of the northern part of the State renders them available for use on these lands. These light sandy soils are usually deficient in lime and the use of marl on such soil would supply the necessary lime in a noncaustic form and at the same time tend to improve the texture of the soil and make it more retentive of moisture. Since the lime is in such a mild form large quantities, from five to twenty tons per acre can be used without danger of damage to crops. These marls would also prove useful in improving the texture and lime content of heavy clay lands; but it must not be expected to produce such striking effects as much smaller quantities of air slaked lime.

It should be kept in mind that these marls are in no sense complete fertilizers, like stable manure and some kinds of commercial fertilizers. The marls are to be considered from the standpoint of materials to be used at long intervals, an application every seven to ten years, for the purpose of making a somewhat permanent improvement of the land and producing conditions under which the usual manures can be used to better advantage.

We are often asked if these marls can not be mixed and sold as commercial fertilizers. The large amount required per acre would limit their use to lands near the pits, and from what has been said above it will appear that they are in an entirely different class from commercial fertilizers.

Marls of this composition are suitable for the manufacture of cement, and if owners of marl deposits wish to exploit them commercially there is a much better outlook for them in the cement business than in the fertilizer trade. Cement factories would, of course, require large thick beds of fifty acres or more and with as thin overburden as possible, so as to be assured of an abundant supply and a moderate cost of mining. Several large cement factories are now using these marls.

EXAMINATION OF PROTUBERANCES ON SUGAR BEETS.

H. A. HUSTON AND A. H. BRYAN.

During the beet harvest of 1899 a number of sugar beets were found which had one or more protuberances on the upper portion of the roots. Samples of these were selected for examination. The two beets alone weighed 200 grams, and the protuberances removed from them weighed 275 grams.

One-half the material was used for the ordinary analysis of the juice and the other half was carefully dried and used for the determinations usually made in feeding stuffs.

The juice from the protuberances was very dark in color, specific gravity 1.044; contained 7.2 per cent. of sugar, had a purity coefficient of 65, and it required 1.9 cc. half normal potash to neutralize 25 cc. The juice of the beets from which the protuberances were removed was light in color, specific gravity 1.061, contained 10.6 per cent. sugar, had a purity coefficient of 70.7, and it required 0.6 cc. or half normal potash to neutralize 25 cc.

The normal beets of the same variety in the field were found to contain at this time 15 per cent. sugar, with a purity of 87.

This shows that the quality of the beet is very seriously impaired by the protuberances. Examinations made of the crop in 1900 also confirm this.

The food analyses, reduced to water free basis, were as follows:

TABLE XXIV.

COMPOSITION OF HEALTHY BEETS AND PROTUBERANCE OF BEETS.

CHEMICAL SUBSTANCES.	Beets.	Protuberances.
Ether extract	1.19	0.85
Crude protein	6.50	14
Crude fiber	6.21	7.94
Ash	4.18	7.30
Carbohydrates	61.92	69.91
Total nitrogen	1.04	2.24
Albuminoid nitrogen .....	.73	1.52
Amide nitrogen .....	.31	.72
Starch (by diastase)	5.24	2.29
"Carbohydrates" extracted by 1¼% sodium hydrate	2.44	6.40

II. Brien quotes in general terms results of analyses of Strohmer & Stift, which are similar to these so far as relates to protein and ash.

Our analyses show that the crude protein in the roots is lower than we usually find in normal beets, while the protein in the protuberances is higher. The so-called carbohydrates extracted by dilute alkali is probably an oxy or hydrocellulose. It is included in the carbohydrates in the usual food analysis, but can not be hydrolized to produce any material that will reduce Fehling's solution. Beets affected with bacterial disease contain it in larger quantity than normal beets.

THE CHEMICAL COMPOSITION OF MATERIALS.

H. A. HUSTON AND A. H. BRYAN.

Alkali Incrustation.—The Station frequently receives letters relating to supposed alkali lands, located in different parts of the State. The rainfall in all parts of Indiana is too great to permit the existence of what are properly known as alkali lands. In most cases the trouble is generally due to defective drainage. In some instances a white formation is found at the surface. Some of these were examined and found to be caused by a white fungus. One sample from Stillwell, Laporte County, was examined and found to contain—

TABLE XXV.

COMPOSITION OF ALKALI INCRUSTATION.

Moisture	27.77 per cent.
Volatile and organic matter.....	20.03 per cent.
Sand and clay.....	11.93 per cent.
Ferrous oxide	3.94 per cent.
Alumina	8.49 per cent.
Lime	0.35 per cent.
Magnesia	4.42 per cent.
Sulphur trioxide.....	23.10 per cent.
Soda	1.70 per cent.

The composition of this material is very different from what constitutes alkali in the arid regions. It is mainly sulphates of iron, alumina, and magnesia. It has a pronounced acid reaction. The iron is practically all in the ferrous condition. The organic and volatile doubtless includes some sulphuric acid driven off in ignition.

This material is then quite different from "alkali," and really is a good illustration of what constitutes one kind of acid soil. The general treatment of this kind of land calls for more thorough underdrainage; for local treatment slacked lime should be applied and well mixed with the soil. The lime should be used at the rate of from one-fourth ton to two tons per acre and should be put on the land a month or more before a crop is put in.

Black Eye Cow Pea.—The sample of peas was received from Mr. A. F. Diehl, of Leesburg.

TABLE XXVI.

COMPOSITION BLACK EYE COW PEAS.

CHEMICAL SUBSTANCES.	Air Dry.	Water Free.
Moisture	9.6	.....
Ether extract	2.73	3.01
Crude protein	24.09	26.64
Fiber	2.94	3.25
Ash	4.06	4.48
Carbohydrates	56.63	62.62
Total nitrogen	3.84	4.26
Albuminoid nitrogen	3.57	3.94
Amides .....	.27	.32
Starch (by diastase)	24.70	27.31

The fat, ash and protein are somewhat higher than in analyses quoted from North Carolina and New Jersey for this variety, while the fibre is lower. The starch is much higher than in the soy bean.

Dwarf Soy Beans.—Samples of the beans and of the whole plant were received from Mr. A. F. Diehl, of Leesburg. The whole plant was to be used for feeding. Both samples were in excellent condition. The leaves of the forage were green, but the pods were white and the beans fairly well ripened.

TABLE XXVII.

COMPOSITION OF SOY BEANS.

CHEMICAL SUBSTANCES.	BEANS.		WHOLE PLANT.	
	Air Dry.	Water Free.	Air Dry.	Water Free.
Moisture	7.63	.....	7.14	.....
Ether extract	14.55	15.75	3.07	3.30
Crude protein	35.96	38.93	20.05	21.59
Fiber	4.19	4.53	17.50	18.84
Ash	4.53	4.90	10.53	11.34
Carbohydrates	33.14	35.89	41.71	44.93
Total nitrogen	5.75	6.22	3.20	3.45
Albuminoid nitrogen	4.96	5.33	2.38	2.56
Amide nitrogen .....	.79	.89	.82	.89
Starch (by diastase)	9.05	9.70	6.25	6.73

The beans are about the average for soy beans in protein, somewhat below the average in fat and somewhat above the average in carbohydrates. It is to be noted, however, that only a little over one-fourth of the carbohydrates are in the form of starch.

The whole plant is somewhat higher in fat and a little lower in protein and fibre than the average.

Digestion experiments have shown that the fat and protein of the soy bean are readily digestible.

Examination of Water for Cooking Purposes.—A sample of water from Martinsville was sent to the laboratory, with a statement that it was unsatisfactory for domestic purposes, and especially for cooking beans.

The sample was found to contain 102.2 parts solid matter per 100,000 and larger amounts of sulphates were present.

Various methods of softening the water were tried and cooking tests made with the resulting products. Parallel tests were made with distilled water and with city water containing about one-third as much solid matter as that from Martinsville. None of the methods of softening the Martinsville water proved effective, and it seems to be a water that is too hard for domestic purposes to admit of any practical improvement at reasonable cost. The amount of water available did not permit of fuller investigation. The total solid matter in the water is over twice as much as is considered admissible in waters for domestic purposes and very much more than is desirable.

Ash of Oat Clippings and Oat Dust.—At elevators where oats are handled considerable waste in the shape of oat clippings and oat dust is obtained. This is frequently burned, and inquiries are received in regard to the value of the ash. The ash from oat clippings obtained at Bourbon was found to contain 4.58 per cent. of potash and 2.50 per cent. of phosphoric acid. The ash from oat dust obtained at Kentland was found to contain 2.90 per cent. of potash and 1.85 per cent. of phosphoric acid. Neither sample contained any soluble phosphoric acid.

The potash in the ash of oat clippings is nearly as great as that found in good quality of wood ash, while the phosphoric acid present is about double the average amount in wood ashes. The ash of the oat dust is not of as good quality as that of the clippings, but it is well worth saving and is worth fully three times as much as leached wood ashes, which are still considered of value in some sections of the country.

Corn Cob Ash.—Considerable quantities of corn cob ash accumulate at elevators, and the question of the value of the ash is often raised. It has long been known that this ash is of better quality than wood ashes. In answer to an inquiry from Vincennes we asked that a carefully drawn sample of the unleached ash be sent us.

The analysis showed it to contain of potash 16.03 per cent., and a total phosphoric acid of 5.25 per cent. The phosphoric acid was found to be in three forms, water soluble 2.87 per cent., reverted phosphoric acid 2.28 per cent., insoluble phosphoric acid 0.10 per cent. Heretofore only the total phosphoric acid in this material has been reported, and it has been considered as all insoluble and of very little immediate value. The result of our work shows that practically all of the phosphoric acid is in

as available form as that contained in the best form of commercial phosphates. Over one-half of it is in the form of phosphate of potash. The high per cent. of potash and the availability of the phosphoric acid in corn cob ash renders it a very valuable fertilizing material. Moreover, it is one of the few crude materials containing water soluble phosphoric acid and at the same time having a marked alkaline reaction. This makes it especially valuable for use on heavy acid clay lands, as it would supply phosphoric acid and potash and at the same time correct the acidity of the soil and materially improve its mechanical condition. It should be applied broadcast, in a finely divided condition, and be well harrowed in some time before seeding. On account of the readily soluble state of the potash and part of the phosphoric acid, the acid should be carefully protected from leaching until it is used.

TABLE XXVIII.

COMPOSITION OF FIVE SAMPLES OF LIMESTONE.

	Sample No. 1.	Sample No. 2.	Sample No. 3.	Sample No. 4.	Sample No. 5.
Insoluble in hydrochloric acid.....	28.60	45.43	38.31	38.92	45.83
Silica.....	.60	.57	.59	.83	.57
Iron and alumina.....	1.67	3.85	3.49	2.67	3.96
Lime.....	22.45	16.60	19.20	18.16	16.60
Magnesia.....	14.40	9.50	10.74	11.26	9.20

Limestone for Sugar Beet Factory.—Five samples of limestone were taken from different levels in a quarry near Shelby, Indiana, and examined for the purpose of finding out whether they are suitable for use in sugar beet work.

For use in sugar beet factories a fairly pure limestone is desired. These samples contain very high amounts of clay and sand and the large amount of magnesia present shows that the material is more properly an impure dolomite. The magnesia would be objectionable in purifying juices and it would be more profitable to use the pure limestone from the Bedford or Bloomington region. There is also a better stone than this in northern Indiana.

Two samples from North Judson showed an improvement in lime content containing 42.04 and 39.34 per cent. of lime. The purest commercial limestones contain from 50 to 55 per cent. lime.

Water of the Kankakee River.—In November, 1899, a small sample of Kankakee River water was received with a request to examine it, with a view to determining its suitability for use in sugar beet factory. A qualitative examination showed that the only objectionable matter present in any considerable quantity was sulphate of calcium. The total solid

matter was found to be 21.8 parts in 100,000, and of this 10 parts were calcium sulphate. Spencer, in his Handbook for Beet Sugar Chemists, states that water for factory use should not contain over 10 parts of calcium sulphate per 100,000. The total solid matter in this water is much less than that in the water used in beet factories in New Mexico, Utah and California. This water is suitable for beet factory purposes, and it should be noted that, since the Kankakee was low at the time of taking the sample, the solids are likely to be reduced by rainwater when the river is at a higher stage.

TABLE XXIX.

COMPOSITION OF DISTILLER'S GRAIN, DRIED.

CHEMICAL SUBSTANCES.	In Sample as Received. Per Cent.	Water Free. Per Cent.
Moisture	7.64	.....
Ether extract	13.52	14.61
Crude protein	31.76	34.17
Fiber	13.40	14.72
Ash	1.71	1.85
Carbohydrates	32.17	34.65
Total nitrogen	5.05	5.46
Albuminoid nitrogen	4.78	5.17
Amide nitrogen	27	29
Starch (by diastase)	2.13	2.30
Pentosans	23.17	25.09

Dried-Distillers' Grain.—The sample was received from Aurora, but was made at Lawrenceburg.

This material is of rather better quality than the average for this kind of material. But the product of different distillers is liable to vary considerably on account of the difference in raw materials used. As a feeding stuff the main value of this material is in the protein and fat. Although a little starch is indicated by the diastase method, no reaction for starch could be obtained with iodine.

The material has been subjected to such exhaustive fermentation that only the more resistant carbohydrates remain, and these must be considered far less digestible than starch or ordinary grains.

This class of material is exported to Germany, where it is well liked for production of both meat and dairy products. If it can be purchased at reasonable rates it should be found a very convenient material in compounding rations. It belongs in that group of concentrated feeding stuff represented by gluten meals, but only very few mills make a gluten meal containing as much fat as this sample. See above table, XXIX.

Formaldehyde.—In the annual report of last year we gave an account of some tests of the various methods of determining formaldehyde and the formaldehyde content of some commercial samples. Three more samples were examined this year for the Botanical Department. The cyanide method was used:

TABLE XXX.

FORMALDEHYDE TESTS FOR STRENGTH.

SOURCE.	Formaldehyde Per Cent. by "Volume."	Formaldehyde Per Cent. Weight.
Henry Heil & Co. Bottled	40.8	36.9
Hogan & Johnson. Bulk	40	37
Eimer & Amend. Bottled	41.9	38.9

There now seems to be little difficulty in obtaining commercial formaldehyde containing 40 degrees by volume, which is probably what the manufacturers mean by a 40 per cent. solution. It would be more exact to express the percentage by weight.

Hominy Chop or Feed.—This sample was drawn at the mill at Lafayette, and special care was taken to obtain a representative sample.

It is a side product obtained in the manufacture of hominy or of grits and consists of the germs, the bran and more or less meal. The material may vary considerable, depending on the grades of materials which the manufacturer desires to make. The most conspicuous variation will be in the starch.

TABLE XXXI.

CHEMICAL COMPOSITION OF HOMINY CHOP OR FEED.

CHEMICAL SUBSTANCES.	Per Cent.	Water-Free Per Cent.
Moisture	8.84	.....
Ether extract	7.63	8.37
Crude protein	11.50	12.94
Fiber	4.12	4.52
Ash	2.62	2.87
Carbohydrates	65.29	71.30
Total nitrogen	1.84	2.07
Albuminoid nitrogen	1.78	1.96
Amide nitrogen .....	.06	.11
Starch (by diastase)	35.40	38.83

This sample has about the same content of protein and fat as the average of twenty recent analyses made in New England. It is materially higher in both protein and fat than average dent corn. This material bears about the same relation to white corn that bran does to wheat. As compared with bran this material is higher in fat and carbohydrates and lower in protein and fibre.

Feeders state that where hominy chop alone is used cattle are apt to get "off their feed," but that this may be avoided if a mixture of hominy chop and good wheat bran is used.

"Ground Oats."—A sample of feed sold as ground oats was received from Orleans. The selling price was stated to be \$13.50 per ton. It had the following composition:

TABLE XXXII.
CHEMICAL COMPOSITION OF SO-CALLED "GROUND OATS."

CHEMICAL SUBSTANCE.	As Received. Per Cent.	Water-Free. Per Cent.	Average Oats, Water-Free. Per Cent.
Moisture.....	6.55	.....	.....
Ether extract.....	2.55	2.73	5.6
Crude protein.....	5.98	6.40	13.2
Fiber.....	27.43	29.35	10.8
Ash.....	6.90	7.50	3.4
Carbohydrates.....	50.59	54.02	67
Total nitrogen.....	.95	1.02	.....
Albuminoid nitrogen.....	.86	.92	.....
Amide nitrogen.....	.09	.10	.....
Starch (by diastase).....	16.05	17.17	.....

It is evident that the material is not ground oats. It resembles some of the very poorest of the "oat feed," and differs but little from the composition of oat chaff.

The material is too low in fat, protein and real starch to be considered a concentrated feeding stuff, and \$13.50 spent for whole oats would have procured more than twice as much valuable food ingredients as this material contained. Materials of this class have had an important influence in some States in procuring legislation requiring that commercial cattle feeds shall be sold with a guarantee showing the amount of protein and fat contained in them. Such laws speedily drive inferior goods from the markets of the States where they are in force, and the inferior goods appear in greater quantity in States where the consumer has no protection. Consumers would do well to use great caution in the purchase of commercial feeding stuffs. In discussing oat feeds the Connecticut Experiment Station states that "no feeder can afford to use them, however cheaply he can buy them. They ought not to have a place in the feed market."

HOT HOUSE TOMATOES.

Two samples of tomatoes grown in the Station hothouse were analyzed with the following results:

TABLE XXXIII.
CHEMICAL COMPOSITION OF TOMATOES.

VARIETY.	Lezillard.	Stone.
Moisture	94.26	92.83
Solid matter	5.74	7.17
Ether extract .....	.29	.42
Crude protein	1.27	1.25
Fiber .....	.50	.68
Ash .....	.81	.84
Carbohydrates	2.87	3.98
10 per cent alcohol extract.....	4.49	5.60
Dextrose in alcohol.....	1.32	1.85
Sucrose by polariscope .....	.15	.10
Acids (as malic) .....	.44	.57
Dextrose by polariscope.....	2.16	2.65

The reducing sugars by polariscope were tried on the fresh sample after clarifying with alumina cream. There is noted a discrepancy between the figures obtained by this method and by the gravimetric method employed with the alcoholic solution. It is interesting to note the amount of material extracted by 10 per cent. alcohol. This amount contains the sugars, acids, coloring matter in part and more than likely some of the protein, since a larger part of the nitrogen in the tomatoes is not in the form of real albuminoids, but is in soluble form. The work on these samples was done on samples partially dried at low temperature on steam coils, and the drying finished in boiling water oven. There was doubtless some loss of sugar caused by the high temperature used, but the results are comparable with results of the analysis of tomatoes generally published.

SOWING CLOVERS AT DIFFERENT DATES.

J. H. SKINNER.

In the spring of 1898 a series of plats containing one-fortieth of an acre each were laid out for the purpose of testing four varieties of clover sown at different dates. The soil is a compact loam with a gravel subsoil. The land was in corn the previous year and sown to rye in the fall. The following spring it was plowed, well rolled and pulverized. Just before each

sowing the land was cultivated two inches deep with an Albion harrow. After sowing it was run over with a Breed's weeder, and rolled, unless the soil contained too much moisture.

The dates of sowing were April 15, May 15, June 15, July 15, August 15, September 15. Notes on the condition, growth, stand, etc., of the different sowings were taken November 1, 1898, and are as follows:

APRIL SOWING.

Red Clover.—Splendid stand in good condition; four inches high.

Alsike.—Equally good.

Alfalfa.—One-half stand, four to seven inches high; plants yellow and weak.

Crimson Clover.—One-half stand; plants in bunches, with large vacant spaces.

MAY SOWING.

Red Clover.—Five to seven inches high; splendid stand.

Alsike.—Four to six inches high, good stand.

Alfalfa.—Six to eight inches high, one-half stand, plants thrifty.

Crimson Clover.—One-fifth of a stand, plants healthy.

JUNE SOWING.

Red Clover.—Six inches high, good stand.

Alsike.—Six inches high, good stand.

Alfalfa.—Ten inches high, good stand, thrifty.

Crimson Clover.—Four inches high, two-thirds of a stand.

JULY SOWING.

Red Clover.—One-half stand, two inches high, not thrifty.

Alsike.—One-third stand, two inches high, thrifty.

Alfalfa.—Three-fourths stand, three to five inches high, yellow, weakly plants.

Crimson Clover.—One-half stand, two inches high, healthy.

AUGUST SOWING.

Red Clover.—Good stand, three inches high, healthy.

Alsike.—Good stand, three inches high, healthy.

Alfalfa.—Three-fourths stand, three inches high, healthy.

Crimson Clover.—Three-fourths stand, two to four inches high.

SEPTEMBER SOWING.

Red Clover.—Good stand, very small.

Alsike.—Good stand, very small.

Alfalfa.—Good stand, very small.

Crimson Clover.—Three-fourths stand, very small.

The winter of 1898 and 1899 was a severe one with many sudden changes, which were very injurious to clovers.

The following table shows the yield on the various plats in—

TABLE XXXIV.
DATES OF CUTTING AND YIELDS OF CLOVER.

Date Seeding, 1899.	Cutting.	Red Clover.	Alsike.	Alfalfa.	Crimson Clover.
April 15	{ First	135 pounds.	†145 pounds.	None	None.
	{ Second	75 "	50 "	None	None.
May 15	{ First	125 "	125 "	45 pounds.	None.
	{ Second	62 "	40 "	25 "	None.
June 15	{ First	95 "	†120 "	45 "	None.
	{ Second	53 "	30 "	25 "	None.
July 15	{ First	55 "	60 "	45 "	None.
	{ Second			50 "	None.
August 15	{ First	†35 pounds.	80 pounds.	105 "	None.
	{ Second			25 "	None.
September 15	{ All winter killed.				

Note.—* Was one-fifth weeds. † Was two-fifths weeds. ‡ Was one-fifteenth weeds.

The table above shows that the red clover made the best yield for the April sowing, with a gradual decrease for each successive sowing until that of September 15, which had been frozen out completely. The alsike gives a similar record with the exception of the July sowing, which made less than that for August. This was probably due to the fact that there was a poor stand, as is shown by the notes above. Alfalfa shows very different results. The April and May sowings were frozen out entirely. The June sowing gave a small yield and had many weeds in it. The July sowing a slight increase over that sown in June, with many weeds, while the August sowing made very much the largest yield and was free of weeds. The entire failure of the April and May sowings of alfalfa and a gradual increase in yield for the successive sowings is probably due to three conditions—the weather at the time of sowing and after; the lack of care in neglecting to mow and keep the weeds down; then the freezing and thawing broke a larger number of roots and heaved many more plants in the early sowings. Only a few plants in the August sowing were severely injured by freezing, as the roots were just deep enough to hold fast to the upper layer of soil, raising and settling as the soil did without breaking the roots. The crimson clover was a complete failure, not a single plant coming through the winter alive.

This work was taken up again in the spring of 1899. The season was a very unfavorable one, and insects, such as grasshoppers, squash bugs and potato bugs, aided it in destroying the young plants, so that the whole season's work was a failure.

SUMMARY.

1. Where the season is favorable, red and alsike clover may be sown as late as June 15, with a remarkable assurance of getting a stand.
2. It is more difficult to get a stand of alfalfa than either of the above.
3. Alfalfa requires that the seed bed be more carefully prepared than that for red or alsike clover.
4. Alfalfa can not stand choking by weeds. For this reason sow on clean land.
5. The plants themselves must be clipped with a mower about once a month.
6. Alfalfa is easily winter killed the first year, as many of the roots are broken by the lifting, due to freezing.
7. It was found by leaving these clovers stand through a second winter that nearly all the red and alsike were killed, while the alfalfa came through the second winter very much stronger than it did the first, with but few plants injured.
8. It was very hard to get a stand of crimson clover.
9. Crimson clover will not live through a severe winter unprotected.

FORAGE CROPS.

— — — — —
J. H. SKINNER.
— — — — —

The annual report of 1899 gives a complete account of the work done at Purdue on forage crops up to that time.

It was with the purpose of getting more data as to the comparative yields of different crops, also to learn what rate of seed gave best results, that the work was again taken up.

The plants contained 1-18 acres each. Two were sown with the same variety of seed; one drilled in rows eight inches apart, the other sixteen inches apart. The land was plowed seven inches deep May 25, and rolled down firmly and thoroughly pulverized. Just before sowing a plank drag was run over it, leaving a very superior seed bed with a smooth surface.

The various crops were sown May 26 with a Crown drill, the drill being set to sow one bushel where the rows were eight inches apart and two bushels where sixteen inches apart.

The season was a favorable one. With the exception of the first part of June, the rainfall was sufficient and well distributed. The crop was cultivated with a Breed's weeder June 12, in order to break a crust which had formed on the surface of the soil. This was the only cultivation given, as the soil was in good condition and free from weeds. Care must be taken in the use of the weeder or the injury to the plants will be far greater than the benefit. They can be cultivated with a weeder when from four to eight inches high, if it be done when they are free of moisture, that is in the heat of the day. If cultivated when smaller many plants are destroyed by being broken off and the same is true where they are very much larger.

COW PEAS.

Only two varieties were used, as we were unable to procure seed enough for as large plats as we desired.

Whip-poor-will.—This variety is a thrifty grower and one of the earlier ones. It produces long vines, which trail on the ground.

The plat where the rows were sixteen inches apart, was cut for seed and gave a yield of eighteen bushels per acre, while the plat having rows eight inches apart was cut and put in the silo. Yield of green forage four tons. Considerable loss, which could not be estimated, would raise the yield in both cases.

Black.—This variety is a vigorous grower, making more vine and less grain than the Whip-poor-will. It is also several days later. Yield of forage from 4 to 4.5 tons per acre.

Note.—It was easily seen that where the rows were 16 inches apart the yield of beans was greater, while the yield of forage was less, than where they were eight inches apart.

SOY BEANS.

The soy beans showed just the reverse of what occurred with the cow peas, that is, that soys produced more beans and less forage where sown eight inches apart.

The soy bean grows upright and is much more easily handled and harvested than the cow pea.

Kysuke is a dwarf which makes a better yield of grain than forage. It is early and a vigorous grower. The estimated yield of forage is 2.5 to 3 tons; grain, 15 bushels.

Black.—This variety did not germinate well, so no comparison as to yield is possible. The few that grew made a large yield of forage and small yield of grain. It is a late variety.

Medium Green is a very promising variety which grows three to four feet high on this soil. The leaves are large and would make splendid hay.

This variety made from 4 to 4.5 tons green forage and sixteen to eighteen bushels grain where harvested. The beans must be cut before ripe, or they will shell out badly.

SORGHUM.

The sorghum was too thick in both wide and narrow rows, and lodged badly on this account. Where the rows were eight inches apart it was not so coarse as that where the rows were sixteen inches apart. The difference in the yield on the different plats was not very great, but the variation in yield of different varieties was marked, as the following table shows:

TABLE XXXV.

YIELD OF SORGHUM.

VARIETY.	Rows Eight Inches Apart.		Rows Sixteen Inches Apart.	
	Pounds per Plat.	Tons per Acre.	Pounds per Plat.	Tons per Acre.
Coleman's.....	2,540	22.8	2,255	20.3
Folger's Early.....	1,650	14.9	1,615	14.5
Early Amber.....	1,660	14.9	1,785	16+
Early Orange.....	1,550	13.9	1,530	13.7

The above table shows, with one exception, a greater yield for the rows eight inches apart.

CORN.

Common field corn and Stowell's Evergreen were the only varieties used. Both grew well. The field corn made a larger yield but was two or three weeks later than the Evergreen, which was ready to use by the last of July. The corn was not cut for green forage, so only an estimate of the yield could be gotten. The corn grew better and made a much better yield where drill was set to sow one bushel per acre in rows eight inches apart. The yield is estimated at seven to eight tons for the Evergreen and ten tons for common corn.

The work done indicates that so far as yield is concerned, sorghum stands at the head, common corn second and Stowell's Evergreen third.

The cow pea and soy bean make a small yield as compared with the other crops grown, and live stock must be educated to eat cow peas and soy beans.

Only the earlier varieties of cow peas can be depended on for a grain crop in this latitude, as the later ones do not ripen before the early frosts.

Soy beans may be made a profitable grain crop on the proper kind of soil.

The cow pea and soy bean both make good hay, but are very difficult to cure in this section.

Cow peas and soy beans make a splendid green manuring crop and may be a valuable substitute for clover that has been winter killed.

AN IMPROVED COW STALL.

H. E. VAN NORMAN.

The ideal cow stall should have among other requisites, the following: A fastener that will hold the animal securely, be easy to fasten when securing the animal and to unfasten when turning it out. The fastener should be so arranged that there is no danger of the animal getting the feet caught in it, and should give the maximum of liberty commensurate with cleanliness.

The stall should be so constructed as to keep the animal clean and to absolutely prevent any possibility of one animal injuring another, either by stepping on the udder or by hooking, also prevent one from frightening another by being able to almost reach it.

The manger should hold the necessary feed and roughage, keeping it within reach of the animal, preventing it being gotten under foot and should be easily cleaned of all refuse matter. Often the owner of a herd of cattle desires a stall that will expose to the visitor's view as much of each animal as possible without lessening the security to his animals.

A stall should be inexpensive and strong.

The following is a description of a stall which has given excellent satisfaction in over a year's service in the Station cow barn, and possessing the above mentioned features: Fig. 2 represents the arrangement for

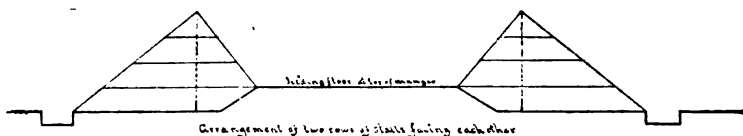


Fig. 2.

two rows of stalls facing each other with the feeding alley raised to the top of the manger, allowing feed and hay to be swept into the manger and refuse to be swept out of the manger into the alley for removal. The stall may be constructed of 2-inch lumber, dressed on two sides, or if to be white-washed $1\frac{1}{2}$ -inch stuff, rough, will hold the white-wash better than if smooth. These are standard sizes of lumber, but $1\frac{1}{2}$ dressed and $1\frac{1}{4}$ rough

are strong enough. Fair dairy cows of average size stalls, 3 feet 6-inches from center to center and five feet from gutter to manger will be about

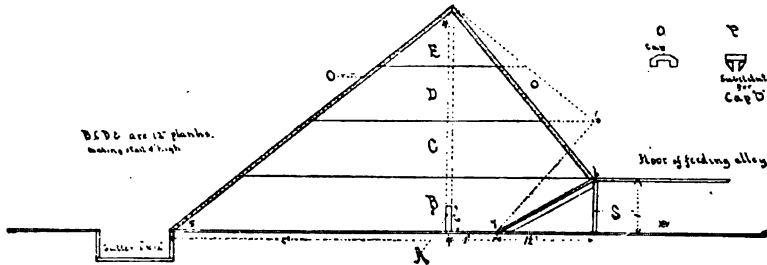


Fig. 3.

right. The animal should have just room to stand comfortably with hind feet an inch from the gutter and front feet just back of A in Fig 3. A

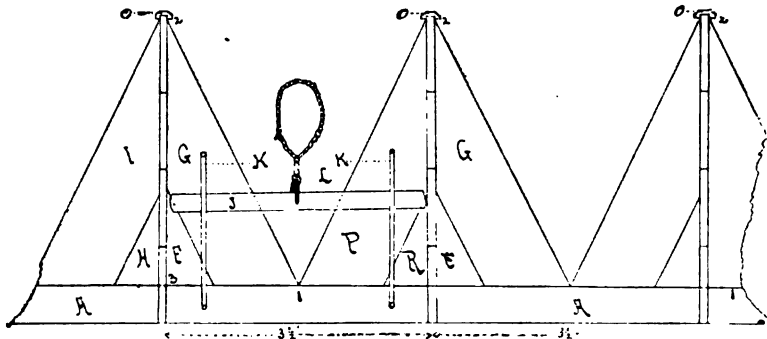


Fig. 4.

desirable arrangement is to place the timber A five feet from the gutter at one end of the barn and enough closer at the other end to fit the smallest animal, thus giving the stalls varied lengths.

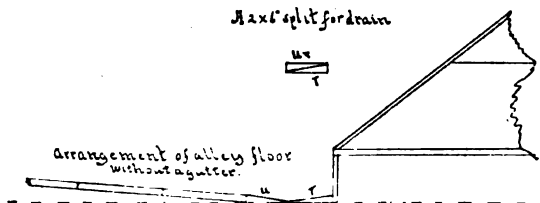


Fig. 5.

To build the stall. Place the 2x6 A (Fig. 3) in position five feet or less from the gutter, then the raised feeding floor should be built with the

joist 8 2½ feet in the clear from A; then cut the plank B and fasten in place, and successively planks C, D and E, holding them temporarily with

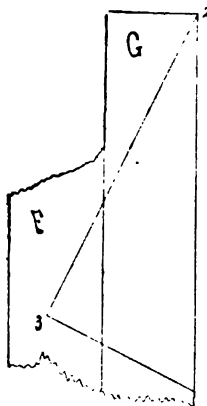


Fig. 6.

a cleat until F and G are secured. To cut F and G, lay two pieces of plank on the floor, and on the one G (Fig. 6) lay off the distance 1 to 2 along the edge equal to the distance from the top of partition 2 (Fig. 4) to middle of manger on top of A at 1, Fig. 4, then mark off 2-3 and 3-1, making the corner at 3 exactly square. It will make little difference if planks G and P, Fig. 4, do not touch at 1. When properly fitted toe nail G to A at 1, and nail B, C, D and E to F and G; then toe nail H and I in place. The partition between stalls is now held securely in place and the operation may be repeated for as many stalls as wanted.

It is well to leave the planks B, C, D, E a little long, or even square and when in position draw lines from 4 to 5 and 4 to 6, Fig. 3, and saw off along these lines. The ends of the planks B, C, D and E should be covered with a partition cap O, Fig. 3, which holds them in place and gives a finished appearance to the stalls. In the absence of the capping O, strips as shown at P, Fig. 3, may be used.

The bar J, Fig. 4, should be one inch shorter than the distance between partitions and made of 1x3 light, strong wood, round corners and slides behind iron staples. K, Figs. 4 and 7, which are made of ½-inch round iron, with nuts on the end or with a hole and key. These staples K should be placed nine inches from the partition and lower end near the floor.

In the middle of J place a clevis of 1x1-8-inch strap iron, in which to fasten a common chain tie. Bore hole for clevis bolt just above the middle of bar. This bar should hang far enough from the neck to allow the cow to stand comfortably with the head in a natural position.

Where conditions make the feeding alley impracticable the front of the manger may be arranged on the plan of the dotted lines in Fig. 3. If desired a 2x2-inch piece may be run along on top of the stalls at 2, Fig. 4, though it is not recommended.

It has been suggested that instead of the butter, a drop be arranged, as shown in Fig. 5. T and U are made of a 2x6, split diagonally.

APPENDIX.

Gifts have been made the Station from time to time, and acknowledgment is herewith made to the friends of the Station for these favors, with thanks for the same. The following have been received from

The Hart Pioneer Nurseries, Ft. Scott, Kan. 10 tree protectors.

S. W. Rarick, Markle, Ind. Peck Winter King wheat.

C. E. Stubbs, Secretary, Fairfield, Iowa. Vols. 4, 5, 6 of the National Register of French Draft Horses.

Frederick L. Houghton, Secretary, Brattleboro, N. H. Vol. 16 Holstein-Friesian Herd Book.

C. R. Thomas, Secretary, Independence, Mo. Vols. 20 and 21 American Hereford Record.

L. B. Baker Mfg. Co., Racine Junction, Wis. Patent sheep collar.

N. B. Deatherage, Richmond, Ky. Peck Swamp wheat.

A. V. Bradrick, Secretary, Shelbyville, Ind. Vol. 9 American Duroc-Jersey Record.

A. J. Temple, Secretary, Cameron, Ill. Vol. 2 American Leicester Record.

W. H. Morris, Secretary, Indianapolis, Ind. Vol. 7 Standard Chester White Record.

H. Stringfellow, Galveston, Tex. "The New Horticulture."

Mortimer Levering, Secretary, Fafayette, Ind. Vols. 12 and 13 American Shropshire Sheep Record.

William E. Henry, State Librarian, Indianapolis. Legislative and State Manual of Indiana for 1899 and 1900.

Hon. John Dryden, Minister of Agriculture, Ottawa, Ontario, Can. Reports Ontario Department of Agriculture.

Diamond Crystal Salt Co., St. Clair, Mich. 1 barrel salt.

F. Barteldes, Lawrence, Kansas. Seed.

Crown Mfg. Co., Phelps, N. Y. Repairs to Crown drill.

Gale Mfg. Co., Albion, Mich. Repairs Albion cultivator.

W. A. Shafor, Secretary, Middletown, Ohio. Vol. 7 American Oxford Down Record.

Hillis & Shoptaugh, Greencastle, Ind. One dust sprayer.

German Kali Works, New York City. German potash salts and various publications.

Isaac A. Smith, Warren, Ind. Peck of oats.

S. J. Lehman & Co., Enon, Ohio. Seedling strawberry plants.

M. Matthewson, Berryton, Kan. Package Kaffir corn.

DeLaval Separator Co., Chicago, Ill. Repair to separator.

Rossville Distillery Co., Lawrenceburg, Ind. Ton distillery dried grains.

John Deming, Brewersville, Ind. Winter oat seed.

United States Department of Agriculture, Washington, D. C. Numerous scientific periodicals, books and seed.

AGRICULTURAL PERIODICALS.

The publishers of the following periodicals have generously sent them free to the Station during the year. These are leading journals and are used frequently by all persons coming in contact with our library:

American Agriculturist.....	New York, N. Y.
Agricultural Epitomist.....	Indianapolis, Ind.
American Creamery.....	Chicago, Ill.
American Gardening.....	New York, N. Y.
American Grange Bulletin.....	Cincinnati, Ohio
American Horticulturist.....	Wichita, Kansas
American Sheep Breeder and Wool Grower.....	Chicago, Ill.
American Swineherd.....	Chicago, Ill.
Baltimore Sun (weekly).....	Baltimore, Md.
Beet Sugar Gazette.....	Chicago, Ill.
Breeders' Gazette.....	Chicago, Ill.
California Cultivator.....	Los Angeles, Cal.
Chicago Dairy Produce.....	Chicago, Ill.
Colman's Rural World.....	St. Louis, Mo.
Creamery Gazette.....	Des Moines, Iowa
Creamery Journal.....	Waterloo, Iowa
Dairy and Creamery.....	Chicago, Ill.
Dakota Field and Farm.....	Sioux Falls, S. D.
Drainage Journal.....	Indianapolis, Ind.
Drovers' Journal.....	Chicago, Ill.
Elgin Dairy Report.....	Elgin, Ill.
Experiment Station Record.....	Washington, D. C.
Farm and Dairy.....	Ames, Iowa
Farm and Fireside.....	Springfield, Ohio
Farm and Home.....	Chicago, Ill.
Farm, Field and Fireside.....	Chicago, Ill.
Farm Journal.....	Philadelphia, Pa.
Farm Poultry.....	Boston, Mass.
Farmers' Call.....	Quincy, Ill.
Farmers' Guide.....	Huntington, Ind.
Farmers' Home.....	Dayton, Ohio
Farmers' Review.....	Chicago, Ill.
Farmers' Tribune.....	Des Moines, Iowa
Farmers' Voice.....	Chicago, Ill.
Feather, The.....	Washington, D. C.
Field and Farm.....	Denver, Colo.
Gazette (weekly).....	Cincinnati, Ohio
Golden Egg.....	St. Louis, Mo.
Grange Visitor.....	Lansing, Mich.

Home and Farm.....	Louisville, Ky.
Hospedarska Listy.....	Chicago, Ill.
Indiana Farmer.....	Indianapolis, Ind.
Iowa Homestead.....	Des Moines, Iowa
Jersey Hustler.....	Lebanon, Ohio
Journal of Agriculture.....	St. Louis, Mo.
Kansas Farmer.....	Topeka, Kansas
Live Stock Journal.....	Chicago, Ill.
Louisiana Planter.....	New Orleans, La.
Market Garden.....	Minneapolis, Minn.
Mirror and Farmer.....	Manchester, N. H.
Montana Fruit Grower.....	Missoula, Mont.
National Farmer and Stock Grower.....	National Stock Yards, Ill.
National Stockman and Farmer.....	Pittsburg, Pa.
Nebraska Farmer.....	Lincoln, Neb.
New England Farmer.....	Boston, Mass.
New York Produce Review.....	New York, N. Y.
Oregon Agriculturist.....	Portland, Ore.
Our Horticultural Visitor.....	Kimmundy, Ill, Benton Harbor, Mich.
Pacific Homestead.....	Salem, Ore.
Pacific Rural Press.....	San Francisco, Cal.
Practical Dairyman.....	Indianapolis, Ind.
Practical Farmer.....	Philadelphia, Pa.
Prairie Farmer.....	Chicago, Ill.
Public Ledger (daily).....	Philadelphia, Pa.
Reliable Poultry Journal.....	Quincy, Ill.
Rural Northwest.....	Portland, Ore.
Southern Farm Magazine.....	Baltimore, Md.
Southern Planter.....	Richmond, Va.
Southern States.....	Baltimore, Md.
St. Paul Dairy Report.....	St. Paul, Minn.
Success with Flowers.....	West Grove, Pa.
Sugar Beet.....	Philadelphia, Pa.
Swine Breeders' Journal.....	Indianapolis, Ind.
Tippecanoe Farmer.....	Lafayette, Ind.
Up to Date Farming.....	Indianapolis, Ind.
Wallace's Farmer.....	Des Moines, Iowa
Western Creamery.....	San Francisco, Cal.
Western Fruit Grower.....	St. Joseph, Mo.
Western Horseman.....	Indianapolis, Ind.
West Virginia Farm Review.....	Charlestown, W. Va.
Wisconsin Agriculturist.....	Racine, Wis.

INDIANA PERIODICALS.

Advertiser	Medaryville
American Standard.....	Frankfort
Banner	Bluffton
Columbia City Mail.....	Columbia City
Democrat	Salem
Home Journal.....	Lafayette
Hoosier State.....	Newport
Lafayette Commercial Gazette.....	Lafayette
Lyons' Herald.....	Lyons
Magnet	Angola
Mennonitische Rundschau.....	Elkhart
News	Monon
Recorder.....	Rising Sun
Register.....	Crown Point
Silent Hoosier.....	Indianapolis

FOREIGN.

Agricultural Gazette of New South Wales.....	Sidney, Australia
Co-Operative Farming.....	Sussex, N. B.
Farmers' Advocate.....	London, Ontario
Farming.....	Toronto, Canada
Queensland Agricultural Journal.....	Brisbane, Australia

Besides the above, the following periodicals are on file in the Station library as regular subscription journals:

American Veterinary Review.....	New York, N. Y.
Berichte der Deutschen Botanischen Gesellschaft.....	Berlin, Germany
Botanisches Centralblatt.....	Cassel-Marburg, Germany
Botanische Zeitung.....	Leipsig, Germany
Bulletin de la Societe Chimique de Paris.....	Paris, France
Centralblatt fur Bakteriologie.....	Jena, Germany
The Entomologist.....	London, England
Gardeners' Chronicle.....	London, England
Journal fur Land Wirthschaft.....	Berlin, Germany
Journal of Comparative Medicine.....	Philadelphia, Pa.
Journal of the Royal Agricultural Society of England...	London, England
Journal of the Chemical Society.....	London, England
Live Stock Journal, The.....	London, England
Veterinary Journal, The.....	London, England
Veterinarian, The.....	London, England
Zentschrift fur Analytische Chemie.....	Weisbaden, Germany

TREASURER'S REPORT EXPERIMENT STATION.

As Treasurer of Purdue University, I hereby submit my report of all moneys received during the year ending June 30, 1900, on account of Experiment Station funds:

From United States Government.....	\$15,000 00
From farm receipts.....	1,836 63

Total	\$16,836 63
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JAMES M. FOWLER,
Treasurer Purdue University.

FINANCIAL STATEMENT.

The Agricultural Experiment Station of Indiana, in account with the United States for the year ending June 30, 1900.

Debit.

Received of the Treasurer of the United States, receipts as shown by the Treasurer's report.....	\$15,000 00
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Credit.

Salaries	\$8,637 70
Labor	2,717 19
Publications	731 35
Postage and stationery.....	77 09
Freight and express.....	80 14
Heat, light and water.....	426 85
Chemical supplies	219 59
Seeds, plants and sundry supplies.....	705 01
Fertilizers	8 55
Feeding stuffs	527 60
Library	93 92
Tools, implements and machinery.....	422 11
Furniture and fixtures.....	68 30
Scientific apparatus	37 90
Live stock.....	53 10
Traveling expenses	40 85
Contingent expenses	4 13
Buildings and repairs.....	148 62

Total	\$15,000 00	\$15,000 00
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I hereby certify that the above is a correct statement of expenditures in the Station Fund for the year ending June 30, 1900.

E. A. ELLSWORTH,
Secretary of Board of Trustees.

**IMPROVEMENT FUND EXPERIMENT FARM FOR YEAR ENDING
JUNE 30, 1900.**

Debit.

Balance June 30, 1899.....	\$414 58
Receipts from farm for year ending June 30, 1900.....	1,836 63

Credit.

Salaries	919 14	
Labor	495 14	
Heat, light and water.....	14 18	
Feeding stuffs	57 30	
Live stock.....	40 00	
Contingent expenses.....	259 30	
Building and repairs.....	32 85	
Balance	433 30	
		<hr/>
Total	\$2,251 21	\$2,251 21

I hereby certify that the above is a correct statement of expenditures from the improvement fund for the year ending June 30, 1900.

E. A. ELLSWORTH,
Secretary of Board of Trustees.

Bulletin No. 82, Vol. X, March, 1900.

ROOTS AND OTHER SUCCULENT FOOD FOR SWINE.

C. S. PLUMB.

Succulent food is usually fed to swine in the central west, but mainly as a summer pasture. The fact that farmers turn their pigs on clover pasture, and have continued the practice is in itself evidence that the method has merit. Observing breeders realize that pigs so handled in summer are healthier and require less grain for profitable growth, than do those kept up and not given pasture. In winter, however, but few farmers feed succulent food to their pigs, the great majority relying on corn, with perhaps some shorts or bran in addition. It is fair to assume, however, that if the succulent food is beneficial in summer profitable returns should be derived from the use of such a material in winter. Inasmuch as some of our most successful pig breeders do feed roots in winter, it is probable that they view their use with favor.

The use of succulent food for pigs has been the subject of investigation at the Indiana Station for some years, and pigs have been fed mangels, sugar beets, artichokes, rape and wild lettuce with the view of ascertaining their value as pig foods and their influence on growth. In June,

1899, the Station published a bulletin (1) on roots as food for pigs, in which a specific report was made upon feeding 12 Chester White pigs in an experiment, in which mangels formed a part of the rations for six of the pigs, the other six receiving only grain food. The following figures, taken from the report of this work show in compact space the results from feeding the 12 pigs from February 1 to April 19.

	Lot I. Fed Mangels.	Lot II. Fed Grain Only.
Cost of food fed	\$10.19	\$12.06
Total pounds gain made	355.5	442.5
Average daily gain made in pounds	4.6	5.7
Pounds of meal and shorts to make pound gain	2.71	3.71
Cost food for each pound gain	2.8 cts.	2.7 cts.

The pigs in this experiment made very satisfactory gains in both lots, yielding a good profit on the feeding, but so far as gains went, they slightly favored those not fed roots.

Mangels, however, are not so desirable a food as sugar beets, as they are less nutritious, sugary and tender. The great advantage in growing mangels lies in the large yield per acre. Sugar beets, however, are relished by all farm animals, and to a greater extent than are mangels, and especially so by pigs. The agitation of growing beets for sugar, has also in localities drawn attention to their value as a food for stock, and has caused some farmers to feed them to their pigs. The favorable comments from such feeding led the writer to introduce feeding some sugar beets at this station to pigs experimentally, under the care of Mr. H. E. VanNorman, the writer's assistant.

FEEDING SUGAR BEETS.

Eight pure bred Chester White pigs were used in this experiment, seven of which were farrowed on July 24 and one (No. 266) on June 10, 1899. These pigs were grouped into two lots of four each. Each lot was fed the same grain food, consisting of one part pure corn meal and two parts shorts, fed as a slightly warmed slop. Of two lots, lot 1 was fed cut up sugar beets in the slop. No liquid was fed excepting water.

This experiment began on November 8, 1899, and closed on February 14, 1900, extending over a period of ninety-eight days. The pigs were each weighed at about the same time in the day, once a week, and the feeding was consequently divided up into feeding periods of seven days each.

The following table shows the weight of each pig on November 8, and the subsequent weights.

(1) No. 79, June, 1899, Roots as Food for Pigs, by C. S. Plumb and H. E. Van Norman.

BOARD OF AGRICULTURE.
WEIGHTS OF PIGS IN POUNDS.

1899-1900—DATE.	LOT I. FED SUGAR BEETS.					LOT II. FED NO BEETS.				
	No. 269.	No. 271.	No. 272.	No. 273.	Total W'ght.	No. 266.	No. 267.	No. 268.	No. 270.	Total W'ght.
November 8	65.5	55.5	64	53.5	238.5	73	54.5	50	61	238.5
November 15	64	54.5	66.5	57.5	242.5	80	61	51.5	63	253.5
November 22	70	60	73	64.5	267.5	87	68	57	68.5	280.5
November 29	72	66	80	72	290	95	74	63.5	71.5	304
December 6	81	70	85	77	313	103	87	70	77	331
December 13	86	74	88	86	334	111	87	76	81	355
December 20	93	78.5	93.5	91.5	356.5	126.5	100	89	92	407.5
December 27	100	83.5	99.5	100	383	134.5	104.5	95	96.5	430.5
January 3	109	90	106	104.5	409.5	143	111	101	104	459
January 10	119	98	114	118	449	150.5	119	112	110	491.5
January 17	128.5	108	123	123	482.5	160	128	119	120	536
January 24	136	112	131	133	512	181	141	131	132	585
January 31	154	122	144	145	565	184.5	154	144.5	144	632
February 7	159	127	151	159	596	187	162	157.5	148	654.5
February 14	164	135.5	157	164	620.5	208	161	167	146	682
Total gain	98.5	80	93	110.5	382	135	106.5	117	85	443.5
Av. daily gain	1.0	.81	.94	1.12	3.89	1.37	1.08	1.19	.86	4.52

An examination of this table shows that each lot weighed the same, viz.: 238½ pounds, when the experiment began. That the pigs were in good condition physically is evident from the fact that eight of them made an average gain of slightly over a pound per day each during the experiment, which was very satisfactory, when one considers that they were fed during the coldest months of the year.

The pigs were fed in warm pens in the new Station feeding house, a description of which is given in the twelfth annual report of the Station. They, however, did not sleep in the same pens in which fed.

The pigs in Lot I, fed beets, did not grow as well as those in II, and the smallest gaining pig was in this lot, while the greatest growing pig was in Lot II, as was the oldest pig of the eight. After the first week, however, it is interesting to note that every pig in each lot made constant gains, excepting Nos. 266 and 267, each of which fell off very slightly, at one weighing, towards the last of the experiment.

During the ninety-eight days Lot I, fed beets, gained 382 pounds, or a daily average of 3.89 pounds, while Lot II gained 443.5 pounds, or a daily average of 4.52 pounds. Two of the pigs in Lot II made better gains than the two best grown in Lot I.

Foods Fed.—The pigs were fed twice daily, at regular intervals in the morning and late afternoon. The plan was to allow roots to supplant the grain food in Lot I as fully as possible, and still keep up a vigorous growth. Generally speaking, changes in the amounts of food fed were usually made at the beginning of a new feeding period, which began with the afternoon feeding.

The following table shows the amount of food consumed by each lot during the different weekly periods.

TOTAL FOOD EATEN PER PERIOD IN BEET FEEDING EXPERIMENT TO PIGS.

1890-1900—Period.	Lot I. Fed Sugar Beets.				Lot II. Fed No Beets.	
	Corn Meal.	Shorts.	Sugar Beets.		Corn Meal.	Shorts
1. November 8-15.....	14 lbs., 8 ozs.	27 lbs., 12 ozs.	21 lbs., 4 ozs.		20 lbs., 4 ozs.	37 lbs.
2. November 15-22.....	21 lbs.	42 lbs.	42 lbs.		24 lbs., 8 ozs.	49 lbs.
3. November 22-29.....	21 lbs.	42 lbs.	42 lbs.		24 lbs., 8 ozs.	49 lbs.
4. November 29 to December 6.....	24 lbs., 8 ozs.	49 lbs.	61 lbs.		31 lbs., 8 ozs.	63 lbs.
5. December 6-13.....	24 lbs., 8 ozs.	49 lbs.	70 lbs.		31 lbs., 8 ozs.	63 lbs.
6. December 13-20.....	24 lbs., 8 ozs.	48 lbs., 8 ozs.	98 lbs.		42 lbs.	84 lbs.
7. December 20-27.....	24 lbs., 8 ozs.	49 lbs.	112 lbs.		42 lbs.	84 lbs.
8. December 27 to January 3.....	24 lbs., 8 ozs.	49 lbs.	154 lbs.		42 lbs.	84 lbs.
9. January 3-10.....	28 lbs.	56 lbs.	154 lbs.		42 lbs.	84 lbs.
10. January 10-17.....	28 lbs.	56 lbs.	182 lbs.		49 lbs.	98 lbs.
11. January 17-24.....	35 lbs.	70 lbs.	182 lbs.		56 lbs.	112 lbs.
12. January 24-31.....	42 lbs.	84 lbs.	182 lbs.		63 lbs.	126 lbs.
13. January 31 to February 7.....	42 lbs.	84 lbs.	128 lbs.		63 lbs., 8 ozs.	99 lbs.
14. February 7-14.....	42 lbs.	84 lbs.	140 lbs.		49 lbs.	98 lbs.
Total, 98 days.....	396 lbs.	790 lbs., 4 ozs.	1,568 lbs., 4 ozs.		566 lbs., 12 ozs.	1,130 lbs.

This table shows that Lot I ate 396 pounds of corn meal, 790 $\frac{1}{4}$ pounds of shorts and 1,568 $\frac{1}{4}$ pounds of sugar beets, while Lot II ate 566 $\frac{3}{4}$ pounds of corn meal and 1,130 pounds of shorts, or Lot II ate a total of 510 $\frac{1}{2}$ pounds more of grain than Lot I. The pigs seemed to relish the roots and ate them with an appetite never shown by the pigs fed mangels the previous year.

The market value of the foods fed, the amounts eaten and the gains in weight by each lot, are the important factors in the results of the feeding.

The figures relating to values are based on the cost of the milling products to the Station, and the estimated value of the sugar beets for general feeding.

LOT I.

Was fed 396 lbs. corn meal, at 80 cents per 100 lbs.....	\$3 17
Was fed 790 $\frac{1}{4}$ lbs. shorts, at 75 cents per 100 lbs.....	5 93
Was fed 1,568 $\frac{1}{4}$ lbs. beets, at 20 cents per 100 lbs.....	3 14
Total value food eaten by Lot I.....	\$12 24

LOT II.

Was fed 566 $\frac{3}{4}$ lbs. corn meal, at 80 cents. per 100 lbs....	\$4 53
Was fed 1,130 lbs. shorts, at 75 cents per 100 lbs.....	8 47
Total value food eaten by Lot II.....	\$13 00

This shows that the total food eaten by Lot II cost but 76 cents more than that of Lot I.

If, now, we compare the cost of food with cost of grain, we get the following results:

	Lot I.	Lot II.
Cost of food fed.....	\$12.24	\$13.00
Total pounds of gain made.....	382	443.5
Average daily gain made in pounds.....	3.89	4.52
Pounds meal and shorts to make pound gain	3.10	3.82
Cost of food for each pound gain.....	.032	.0293
Cost of food for each 100 pounds gain.....	3.20	2.93

These figures show that the cost of the gain in live weight was 27 cents more per hundred for those fed the beets than for those fed the grain only. While this difference is not large, it is important enough to amount to a considerable figure if extensive feeding were conducted with similar results.

The amounts of dry matter consumed by each lot furnish interesting information of the real amounts of food required. The following table brings this out:

DIGESTIBLE FOOD IN POUNDS CONSUMED BY PIGS.

Lot I.

FOOD FED.	Dry Matter.	Protein.	Carbo-hydrates.	Fat.
396 pounds corn meal	354.02	30.89	264.13	16.03
790 1/4 pounds shorts	697	96.41	395.12	10.03
1,568 1/4 pounds sugar beets	204.71	17.25	159.96	1.57
Total	1,255.73	144.55	819.21	47.63

Lot II.

566 3/4 lbs. corn meal	506.67	44.21	378.02	24.37
1,130 lbs. shorts	996.66	137.86	565	42.91
Total	1,503.33	182.07	943.02	67.31

This table shows that Lot II, which gained 61 1/2 pounds the most, ate 247.60 pounds more dry matter, 37.52 pounds more protein, 123.81 pounds carbohydrates and 19.68 pounds more fat than did Lot I.

While the results from feeding beets to fattening pigs showed no material benefit, it is believed that the beets gave a beneficial influence on the digestive tract, and had brood sows been fed, the beets would have been to their material advantage.

EXPERIMENTS BY OTHERS ON MANGELS, BEETS AND CARROTS.

In his work on "Feeds and Feeding," Henry quotes at considerable length certain Danish feeding experiments on pigs. In reference to the use of roots, I wish to quote from some of the statements made. In comparing mangels and grain, all the lots received skim milk or whey in addition to grain and roots, excepting Lots E and F, to which an equivalent of additional roots was given. It is shown that ten pounds of mangels more than equal and eight pounds about equal one pound of grain in trials. The quality of the pork produced by the different lots was very satisfactory. Even where one-fourth the daily feed was given in the form of mangels no ill effect was noted.

In 1890 a preliminary feeding experiment was made, using beets with different sugar contents, to ascertain their comparative feeding values. Mangels containing 12.71 per cent. dry matter and 8.93 per cent. sugar were fed against fodder beets containing 19.86 per cent. of dry matter and 13.8 per cent. of sugar, or against barley. The experiment included twenty-five pigs, averaging 79 pounds each and lasted seventy days. The indications were, for pigs, one pound of barley had a feed value equal to six or eight

pounds mangels or four to eight pounds of fodder beets. In 1891-92, 204 pigs were fed four kinds of roots, in addition to daily refuse and grain. There were fed:

	<i>Dry Matter.</i>	<i>Sugar.</i>
1. Eckendorf mangels containing.....	11.0 per cent.	6.0 per cent.
2. Elvetham mangels containing.....	13.0 per cent.	8.9 per cent.
3. Fodder sugar beets containing.....	16.5 per cent.	10.9 per cent.
4. Sugar beets containing.....	21.2 per cent.	14.0 per cent.

Lots fed barley only, made the largest gain, closely followed by those half of the grain of which was replaced by roots in the following ration: For one pound barley substituted 7.5 pounds Eckendorf mangels, 6.5 pounds Elvetham mangels, five pounds fodder beets and four pounds sugar beets. These quantities of different kinds of roots proved nearly equivalent in feeding value. The conclusion was arrived at that about 40 per cent. of the dairy ration of the pig may be advantageously made up of roots. Slaughter showed pork from pigs fed roots fully equal to those fed grain only. Carrots are not a profitable crop to grow for feeding live stock, owing to the expense of cultivating and harvesting. Long states (2) that they have long been used for pigs, although they are too rich for feeding animals.

In the Danish feeding experiments above referred to in 1891-94 on nine different estates, 893 pigs were divided into 175 lots. In comparative trials carrots and mangels containing equal quantities of dry matter had similar value in pig feeding. It was shown that the amount of dry matter in roots is of importance, rather than the total weight of quantity of sugar contained.

Later nine experiments with 277 animals in 54 lots were conducted for the study of relative values of barley, mangels and carrots. Two kinds of mangels and four kinds of carrots were used. Dairy refuse was fed all the lots. Roots were fed in such quantities that 0.84 pounds of dry matter in roots corresponded to one pound of grain. The experiments lasted 80 to 130 days, the average being 102 days. The pigs averaged 66 pounds at the beginning of the experiment and 169.6 pounds at the end. The average daily gain made by the lots on different rations was as follows:

Barley	0.986 pounds.
Eckendorf mangel wurzels.....	0.828 pounds.
Elvetham mangel wurzels.....	0.833 pounds.
Vogeser and Champion carrots.....	0.875 pounds.
James and Giant.....	0.900 pounds.

The gains made on roots in these experiments are not up to the previous ones. Carrots are shown to be of similar feeding value for pigs as mangels when equal amounts of dry matter are fed.

(2) Book of the Pig, 1886, p. 254.

RAPE FOR SWINE.

Rape at the present time is the most favorably known of the fleshy-leaved plants for swine pasture, and while but a comparatively small number of trials have been reported showing the value of rape for this purpose, these have attracted sufficient attention to justify further trial.

At the Indiana Station for three weeks during the summer of 1898 we fed rape to pigs. Eighteen Chester White pigs were selected, weighing from 60 to 120 pounds on July 5. These were divided into two lots of nine each, five sows and four barrows being in each group. Each lot was kept confined in a small lot free of vegetation. Lot I was fed such fresh cut rape as it would eat, in addition to a mixture of half corn meal and half shorts, with some skim milk to drink daily. Lot II received the same kind of feed, less the rape. During the three weeks Lot I gained 164½ pounds in weight, or an average of .86 pounds per day per pig, while Lot II, which received no rape, gained 233.5 pounds in twenty-one days, or an average of 1.18 pounds per day per pig. During this trial Lot I ate 274½ pounds of corn meal, 274½ pounds of shorts, 208¾ pounds of skim milk and 395 pounds of rape, while Lot II ate 366½ pounds each corn meal and shorts and 276 pounds of skim milk. If, now, we figure the corn meal at 80 cents per 100, shorts at 60 cents, skim milk at 15 cents and rape at 5 cents per 100 pounds each, we find that each pound of flesh in Lot I cost 2.65 cents and in Lot II 2.47 cents. While these figures show that the cost of production in each case was an economical one, the balance is in favor of the pigs that received no rape.

At the Wisconsin Station two trials of feeding rape to swine have been reported (3) including in all fifty-eight hogs. In both these experiments one lot of pigs was penned and fed soaked corn and also shorts in a slop, consisting of two parts corn and one part shorts by weight. The other lot had the same grain feed with a limited amount of rape in addition. In the first trial the ten hogs on rape ate in seventy-six days 1,386 pounds of corn, 690 pounds of shorts and .32 acre of rape, and gained 853 pounds. The other lot penned ate 2,096 pounds of corn, 1,042 pounds shorts and gained 857 pounds. As the gain is essentially the same in each lot the third of an acre of rape saved 1,062 pounds of grain, or an acre of rape would be worth 3,318 pounds of grain. In another trial of two lots of nineteen each, conducted in the same manner and fed the same rations for forty-nine days, the rape lot ate 2,220.3 pounds of corn, 1,109 pounds of shorts, 0.6 acre of rape and gained 1,066 pounds. The penned lot ate 3,106.5 pounds of corn, 1,553 pounds of shorts and gained 1,076 pounds. The gain is practically the same in this instance also, so that it may be said that the 0.6 acre of rape saved 886.2 pounds of corn and 444 pounds of shorts, or that one acre of rape is worth 2,217 pounds of grain. The average of the two trials indicates that an acre of rape is worth 2,767 pounds of such grain for fattening hogs.

(3) Bulletin 58, Wisconsin Exp. Station, April, 1897.

ARTICHOKES FOR SWINE.

Artichokes for many years have been known as suitable food for pigs, and the live stock and agricultural press have published much relative to the value of this plant for swine. The writer's experience with artichokes has not been so encouraging as reported by others, but perhaps this is due to a somewhat limited experience. Four sows placed in a small field of artichokes that had not been disturbed made a total gain in weight between October 25 and November 8 of twenty-seven pounds. They rooted out the artichokes and were fed in addition 57½ pounds each of corn meal and shorts. Each pig gained much the same in weight. These pigs would, no doubt, have done better had there been a larger area of artichokes to feed on, so that the experiment might have been longer continued. As it was they practically cleaned the lot of all tubers.

Some very flattering reports have been made on artichokes. Coburn quotes A. C. Williams, (4) a prominent and successful Poland China breeder in Iowa, years ago, as writing:

"The keep of my hogs in warm weather is blue grass, clover and Brazilian artichokes. Forty head of hogs and their pigs may be kept without other food on an acre of artichokes from the time frost is out of the ground until the first of June, and from September or October until the ground is again frozen."

At the Oregon Experiment Station six Berkshire pigs weighing from 113 to 215 pounds each were fed artichokes and grain from October 22d to December 11th. They gained 244 pounds in weight, or an average daily gain of 0.81 pounds. The pigs ate 756 pounds of grain during this period, which is 3.1 pounds of grain for each pound of gain in live weight. In other experiments it was found that it required five pounds of mixed grain to produce a pound of gain, hence on this basis the artichokes consumed would represent two pounds of grain in producing each pound of gain in live weight. The pigs consumed the artichokes on one-eighth of an acre, rooting them all out. (5).

Sweitzer of the Missouri Station reports a trial by Porter in which artichokes and wheat meal were fed pigs. It required 325 pounds of wheat meal and 820 pounds of artichokes to produce 100 pounds of increase. (6) In none of the reports on feeding artichokes are results secured in gain of live weight that have not repeatedly been attained by feeding no larger amount of grain than is indicated in these trials where no artichokes were used.

(4) Swine Husbandry, 1877, p. 112.

(5) Bulletin 54, Oregon Agr. Ex. Station, 1898.

(6) Bulletin 29, Missouri Ex. Station.

PURSLANE OR PUSLEY FOR SWINE.

Purslane or pusley, a very succulent common weed, has not been generally used for feed, but it possesses some merits. In 1898, at the Indiana Station, for twenty-one days purslane was fed two Chester White sows. The pigs were of about the same size and age and the purslane was well developed when fed. From September 21 to October 11 the sows were confined in a small yard or pen. They were fed a mixture of half shorts and half hominy meal, twice a day as a slop, and all the purslane they would eat. During this time the pigs consumed $61\frac{1}{2}$ pounds each of hominy feed and shorts and 390 pounds of purslane. One pig weighed 162 pounds on September 20 and $182\frac{1}{2}$ pounds on October 11, a gain of $20\frac{1}{2}$ pounds, and the other weighed 157 pounds on September 20, and 174 pounds on October 11, a gain of 17 pounds. Rating hominy feed at 65 cents per one hundred weight and shorts at 70 cents per one hundred weight, this gain in weight would cost 2.2 cents per pound. The pigs consumed about $18\frac{1}{2}$ pounds of purslane per day between them. It was not eaten with the relish that was to be expected, yet the pigs did very well while receiving it, making fair daily gains.

PUMPKINS FOR SWINE.

Pumpkins have for years been fed by our farmers to some extent to pigs, and while they have, as a rule, met with favor, we know little of their feeding value on the basis of reports. The Oregon Station fed pumpkins to six Berkshire pigs, which were about eight months old, when the experiment began. The pumpkins were cooked in a vat and mixed with shorts. They were fed from October 30 to December 25. Reckoning pumpkins at \$2.50 per ton and shorts at \$12, the amount of the former fed was worth \$9.40 and the latter \$5.54, a total of \$14.94. The total gain in live weight was 499 pounds, making the cost of the food for 100 pounds of gain in live weight \$2. The pigs consumed large amounts of pumpkins, averaging for the two last feeding periods twenty-six pounds each per day. At first only small amounts of shorts were necessary, but later this amount had to be increased. The average daily gain for the entire period was one and one-half pounds per pig. The quality of the meat was very fine. (7).

The real value of succulent fod for swine can not be measured by simple gains in weights of pigs given such food. Undoubtedly where animals are confined to a pure grain diet, the digestive tract is more torpid and sickness is more likely to occur than when succulent food is given. Then the digestive organs are more active and natural in movement and the body is better prepared to resist disease than when pure grain fod is

(7) Bulletin 54, Oregon Agr. Ex. Station, 1898.

fed. The influence of this succulent food on sows in pig or sucking pigs can not be measured by the scales, but the general testimony of practical feeders of experience is that such diet promotes easy parturition, a generous milk flow and vigorous offspring. Pigs that are to be fattened in a short period of feeding do not perhaps need roots in their diet, though I believe it would be to their advantage, but breeding stock, both male and female, and suckling sows will certainly be materially benefited by summer pasturage and roots in winter. Swine should always be fed with discretion the first few days after turning on pasture to prevent bloat, but where roots are fed no special danger is likely to occur.

Of the summer pasture plants, red clover and rape are undoubtedly the most desirable, while the sugar beet and mangel wurzel, all things considered, offer the cheapest food in the form of roots. Possibly swedes or kohlrabi are equally desirable, though they are probably more of unknown quantity with American feeders than the other two. Those roots with the greatest amount of sugar in them, however, will be eaten with more relish, and probably give the best returns, as is shown in the Danish experiments where the sugar contents of beets is reported.

INDIANA AGRICULTURAL EXPERIMENT STATION.

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The Station will take pleasure in sending its publications, free to all citizens of the State, who may be interested in them.

Address: DIRECTOR EXPERIMENT STATION,
 Lafayette, Ind.

BULLETINS OF 1899 ISSUED TO DATE.

- No. 75. The sugar beet in Indiana in 1898. January.
 " 76. Skim milk as a food for young growing chickens. March.
 " 77. Field experiments with corn. Mangel wurzels and the cost of production. Formalin for grain and potatoes. March.
 " 78. San Jose and other scale insects and the Indiana nursery inspection law. May.
 " 79. Roots as food for pigs. June.
 " 80. Sheep scab. September.
 " 81. Field tests with fertilizers on heavy clay lands. December.
 " 82. Roots and other succulent food for swine. March, 1900.

Bulletin No. 83, Vol. X, August, 1900.

TESTS OF SMALL FRUITS.

JAMES TROOP.

The following pages give the results of our tests of varieties of small fruits during the present season. The list includes many varieties, which have been reported before, but it also includes varieties which have either been sent by the originators to the Station for testing or which have been secured from the introducers. Some of them have had several years trial, while others have fruited but a single season. Although the season as a whole was quite favorable for the berry crop, the strawberry plants on the Station grounds gave the poorest results for many years. Raspberries gave a good crop, but blackberries for some reason fell far below the average for a series of years. It is a noticeable fact that, while there are many new varieties of strawberries put upon the market every year, very few of them find a place alongside of Bubach, Haverland, Warfield, Clyde, Greenville, Gandy and a few others in the commercial growers' field. Many

of them are adapted to certain soils and locations only, and can not be recommended for general culture. It is also well known to commercial growers that certain varieties may do well one season and be almost a failure the next; so that a single season's trial is not to be relied upon except as an indication of what they may do under favorable or unfavorable conditions, as the case may be. Hence the necessity for repeated trials.

STRAWBERRIES.

Our list of strawberries comprises eighty-two varieties. A few of the newer ones are mentioned in detail, while the entire list of those which have fruited is given in the following table. Below is a record of the varieties as made up at the time of fruiting:

LIST OF SOME OF THE NEWER VARIETIES.

Beauty, P.*—This was originated by Mr. Christian, of Ohio, and it continues to maintain its reputation for beauty and productiveness, while its quality is very good. It ought to find favor with the commercial grower.

Belt, P.—In certain localities this variety is highly recommended, but on our grounds, this season, it has done only fairly well. It needs to be kept in a high state of cultivation, when it will generally be found to be valuable for the fancy market.

Beverly, B.—This is one of the earliest to ripen; plant vigorous and productive, fruit large and of good quality. A very good berry for general planting.

Bismark, B.—This has fruited but a single season on our grounds, but promises well. It somewhat resembles Bubach, but is of better quality, and being self fertile, it promises to share honors with that old and well-tried variety.

Bush Cluster, B.—This is of late origin and is so named because of its habit of bearing its fruit high up on long fruit stems. It somewhat resembles Parker Earle in that respect. It ripens early and promises well.

Clyde, B.—This is certainly one of the most prolific varieties grown, and deserves a place in the list of market varieties. Its color is most too light for a fancy market berry, but its uniform size and productiveness make it a valuable berry for the general grower.

Dole, B.—Our plants were obtained from Slaymaker & Son, of Delaware, and have fruited but a single season. The fruit is large and very symmetrical, and the plants strong and very vigorous. It promises well.

Dunlap, B.—This variety originated in Illinois, and was named for Hon. H. M. Dunlap, President of the Illinois Horticultural Society. While it has fruited but a single season here, it promises to bear out, in a great measure at least, the many recommendations given it by growers in Illinois. The plant is very strong and vigorous, productive and free, thus far.

P* indicates that the variety is pistillate or self-sterile.

B indicates that it is bi-sexual or self-fertile.

from disease of any kind. The fruit is not only large, but even in size and presents a beautiful appearance.

Enormous, P.—This is a vigorous growing plant, holding its fruit well up on strong stems; fruit large, firm and of good quality. Medium in time of ripening.

Gibson, B.—Originated in New York. The plant is strong and vigorous; fruit large, uniform in shape and very firm, making it a good shipping berry. Judging from a single season's trial it will prove a good variety for the commercial grower.

Gladstone, B.—This is a Pennsylvania variety, and as grown in the east, it is said to be a wonderful berry. It has shown during the past season wonderful vigor of plant, and will be in condition another year to show what it can do in the way of fruiting.

Glen Mary, B.—Originated in Pennsylvania, and has become quite well known as a vigorous and productive variety; fruit very large, but under high culture, inclined to be uneven.

Jerry Rusk, B.—Although this has been fruited for several years, it does not seem to have attracted the attention that it deserves. On our grounds it stands next to Clyde in point of productiveness; the berry is darker in color, making it more attractive as a market berry, and the quality is a little better than Clyde.

Johnson's Early, B.—This is a great improvement over Michel's Early, as grown here. The fruit is large and of good color and quality. Grown but a single season, but it promises well.

Klondike, B.—This is a new variety from Massachusetts and seems to possess some good qualities. We have grown it but a single season, but it has proved to be a good grower, ripening its fruit ten days to two weeks later than Johnson's Early.

Marguerite, P.—This variety originated in northern Indiana, and is said to be a seedling of Jewell, fertilized by Jessie. It is a vigorous grower, and the past two seasons has produced heavy crops of large fine berries, which ought to bring the highest price in any market.

The following table gives in condensed form information concerning all the varieties tested. They are graded on a scale from 0 to 10, the latter number being perfect. The size of the berry is indicated by l, for large; m, medium, and s, for small:

TABLE OF VARIETIES OF STRAWBERRIES.

VARIETY.	Sex.	Originated in	First Ripe.	Vigor of Plant.	Productiveness.	Size.	Quality.	Firmness.
Afton.....	P	New York.....	June 5.	7	7	l	9	8
Alabama.....	B	Alabama.....	June 5.	8	8	m	9	7
Auburn.....	P	New York.....	June 7.	9	9	m	9	8
Allen's No. 1.....	P	Maryland.....	June 1.	8	8	m	8	8
Beauty.....	P	Ohio.....	June 2.	9	9	l	9	8
Bedar Wood.....	B	Illinois.....	May 29.	9	8	m	8	8
Belt (Wm.).....	P	Ohio.....	June 4.	9	9	l	9	9
Beverly.....	B	Massachusetts.....	May 30.	8	9	l	8	9
Bismark.....	B	Arkansas.....	June 3.	9	9	l	9	9
Blonde.....	P	Indiana.....	May 30.	10	9	l	9	9
Boynton.....	P	Ohio.....	May 25.	9	9	m	8	7
Brandywine.....	B	.....	June 3.	9	9	l	9	8
Brunett.....	B	Indiana.....	May 31.	10	9	l	10	8
Bubach.....	P	Illinois.....	June 3.	10	10	l	8	7
Bush Cluster.....	B	.....	May 30.	8	9	l	9	9
Clyde.....	B	Kansas.....	June 3.	10	10	l	9	9
Crescent.....	P	Connecticut.....	June 7.	9	9	m	8	10
Cumberland.....	B	Pennsylvania.....	June 5.	8	9	l	9	7
Dayton.....	B	Ohio.....	May 30.	7	7	s	8	7
Dole.....	B	.....	June 3.	9	9	l	8	9
Dunlap.....	B	Illinois.....	June 4.	9	9	l	9	9
Eclipse.....	P	Div. Pomology.....	May 30.	9	9	m	8	8
Edgar Queen.....	P	Illinois.....	June 2.	10	8	l	8	9
Enormous.....	P	Illinois.....	June 2.	10	9	l	9	9
Epping.....	P	New Hampshire.....	June 2.	8	9	m	9	9
Eureka.....	P	Ohio.....	June 3.	10	10	l	9	9
Eva.....	B	Indiana.....	June 3.	8	7	s	8	7
Fairmount.....	B	New Jersey.....	June 2.	9	8	m	9	8
Farnsworth.....	B	Ohio.....	June 3.	9	9	m	9	8
Gandy.....	B	New Jersey.....	June 8.	9	9	l	9	10
Gibson.....	B	New York.....	June 6.	9	9	l	8	10
Gladstone.....	B	Pennsylvania.....	June 5.	10	9	l	9	9
Gladys.....	P	Ohio.....	June 3.	10	9	l	10	9
Glen Mary.....	B	Pennsylvania.....	June 3.	10	9	l	9	8
Gov. Hord.....	B	Wisconsin.....	June 5.	10	8	l	9	8
Green Prolific.....	P	New Jersey.....	June 4.	10	8	l	9	9
Greenville.....	P	Ohio.....	June 2.	10	10	l	9	9
Haverland.....	P	New Jersey.....	May 30.	10	10	l	8	8
Hoosier.....	B	Indiana.....	June 8.	10	9	l	10	8
Howard.....	P	Indiana.....	June 4.	10	8	l	9	9
Huntsman.....	B	Missouri.....	June 6.	9	8	m	8	8
Jay Gould.....	P	.....	June 7.	8	8	l	9	8
Jerry Rusk.....	B	Indiana.....	June 3.	10	10	l	9	9
Jessie.....	B	Wisconsin.....	May 30.	10	8	l	9	9
Johnson's Early.....	B	Maryland.....	May 30.	9	8	l	9	8
Klondike.....	B	Massachusetts.....	June 10.	9	9	l	8	9
Lady Rusk.....	P	Illinois.....	May 30.	9	8	m	8	8
Leader.....	B	Ohio.....	May 28.	8	8	l	8	8
Louden.....	B	Illinois.....	June 5.	10	8	l	9	9
Louise.....	P	New York.....	June 4.	9	9	m	8	9
Lovett.....	B	New Jersey.....	June 3.	10	8	l	9	9
Mammoth.....	B	.....	June 5.	9	9	l	9	9
Margaret.....	B	Ohio.....	June 4.	9	8	m	9	9
Marshall.....	B	.....	June 6.	9	8	l	9	8
Marguerite.....	P	Indiana.....	June 3.	10	9	l	9	9
Maximus.....	B	.....	June 3.	10	9	l	9	9
McKintley.....	B	.....	June 6.	10	9	l	10	9
Middlefield.....	P	Minnesota.....	May 31.	10	9	l	9	8
Morgan's Favorite.....	B	.....	June 4.	9	8	l	8	8
Muskingum.....	B	Ohio.....	May 31.	10	8	l	10	8
Nick Ohmer.....	B	Ohio.....	June 2.	9	9	l	9	8
'96.....	B	Indiana.....	May 31.	10	9	m	9	8
Parker Earle.....	B	Texas.....	June 7.	8	10	l	9	9
Parker Earle Improved.....	B	.....	June 6.	9	10	l	9	9

TABLE OF VARIETIES OF STRAWBERRIES—Continued.

VARIETY.	Sex.	Originated in	First Ripe.	Vigor of Plant.	Productiveness.	Size.	Quality.	Firmness.
Pawnee.....	B	Indiana.....	May 31.	10	9	l	9	9
Pennel.....	B	Connecticut.....	June 3.	8	8	l	8	9
Perfection.....	B	Indiana.....	June 4.	9	9	m	9	9
Pride of Cumberland.....	B	.....	June 5.	9	9	l	9	9
Purdue.....	B	Indiana.....	June 4.	10	10	l	9	9
Quality.....	B	Ohio.....	June 3.	9	8	m	9	8
Reihl's No. 5.....	B	Illinois.....	June 4.	9	8	m	8	8
Ridgeway.....	B	Indiana.....	May 30.	10	10	l	9	9
Rough Rider.....	B	New York.....	May 31.	10	9	l	9	9
Ruby.....	B	.....	June 4.	10	9	l	9	9
Sample.....	P	Massachusetts.....	June 4.	10	9	l	9	9
Saunders.....	B	Ontario.....	May 31.	10	9	l	9	9
Shuster.....	P	New Jersey.....	June 6.	10	9	l	9	9
Splendid.....	B	Illinois.....	June 3.	9	9	m	9	8
Superb.....	B	Ohio.....	May 31.	10	9	l	10	8
Sweetzer.....	B	Indiana.....	June 7.	9	8	l	8	8
Topeka.....	P	Kansas.....	June 6.	8	7	m	8	8
Warfield.....	P	Illinois.....	May 26.	10	10	m	10	9

Maximus, B.—J. H. Hale, of Connecticut, says this is the "greatest of all strawberries." Our plants were received from him last spring, and while it is too early to enable us to ascertain what it will do here, it has started off in good shape and promises to be worthy of the name.

Mammoth, B.—One season's trial gives us a good opinion of this variety. The fruit is very large, dark red, and quite regular in shape. It will require another season to show what it can do.

McKinley, B.—This variety is recommended very highly by Mr. Crawford, of Ohio, and judging from a single season's trial, on our rather heavy, sandy loam, it will prove to be a valuable berry for Indiana. The plant is healthy and a vigorous grower, and the berry of good form and color, firm enough for a shipping berry.

Morgan's Favorite, B.—This is another large, fine berry, and gives promise of being as productive and strong growing as Bubach. It will require another season to test its productiveness on our soil.

Parker Earle, Improved, B.—This is a seedling of Parker Earle, and resembles the parent, except it throws out runners more freely and ripens up its later berries better. It does not seem to be so partial to a rich moist soil as does its parent.

Pride of Cumberland, B.—The fruit somewhat resembles the old Cumberland in form, but it is more firm, thereby making it a good shipping berry. Its season is medium, and needs a good rich soil in order to do its best.

Pennel, B.—This originated in Connecticut as a chance seedling. We have grown it but a single season, but it promises to be a valuable acquisition.

Ruby, B.—This is a free plant maker, and the fruit large, regular and of good color, and firm enough for a shipping berry. It promises well.

Superb, B.—This is one of the best of the seedlings, sent us by S. B. Christian, of Ohio. It has fruited on our grounds four seasons, under varying conditions, and has held its place among the best.

RASPBERRIES.

The raspberries grown on our trial grounds were planted in 1896, on land that was subsoiled to the depth of 14 inches just previous to planting, and the effect of the subsoiling has been noticeable on both the plants and fruit every year since. I am still of the opinion that on land with a hard, compact subsoil, no treatment will give better returns than a good thorough subsoiling before setting the plants.

The following is a good list for cultivation, whether it be for home use or market: Miller, Cuthbert, Columbian, Golden Queen, Alpha, Conrath, Eureka, Kansas and Nemaha.

The Golden Queen is by far the best of the cream colored varieties.

The following table gives the list of varieties grown, with the standing of each:

TABLE OF VARIETIES OF RASPBERRIES.

VARIETY.	First Ripe.	Last Picking.	Vigor of Plant.	Hardiness.	Productiveness.	Size.	Form.	Quality.
Rubus Neglectus Class.								
Caroline.....	June 17	July 10	9	10	7	m	r	8
Columbian.....	June 21	July 10	10	10	10	l	re	9
Shaffer.....	June 21	July 8	10	10	9	l	re	9
Reliance.....	June 15	July 6	9	10	10	m	re	9
Rubus Strigosus Class.								
Brandywine.....	June 12	July 2	10	10	8	m	re	9
Cuthbert.....	June 22	July 15	10	10	10	l	re	9
Eaton.....	June 18	July 9	10	10	9	l	r	10
Golden Queen.....	June 18	July 10	10	10	10	l	re	9
Louden.....	June 18	July 8	10	10	9	m	r	9
Marlboro.....	June 22	July 10	7	9	6	l	r	8
Miller.....	June 10	July 5	10	10	8	m	r	10
Ridgeway.....	June 15	July 6	9	10	9	l	c	9
Thompson's Early.....	June 10	July 1	9	10	9	m	r	9
Turner.....	June 14	July 1	9	10	8	s	r	8
Rubus Occidentalis Class								
Alpha.....	June 19	July 9	10	10	10	l	r	9
Black Diamond.....	June 19	July 8	10	10	10	l	r	10
Carman.....	June 16	July 4	8	9	7	m	r	8
Conrath.....	June 10	July 1	10	10	10	l	r	10
Earhart.....	June 16	July 1	9	10	8	m	r	9
Eureka (Mohler).....	June 14	July 6	10	10	10	m	r	10
Gault.....	June 18	July 2	8	10	8	m	r	8
Gregg.....	June 20	July 10	9	9	8	l	r	9
Hilborn.....	June 15	July 2	10	10	9	m	r	8
Johnson.....	June 13	July 1	10	10	8	m	r	10
Kansas.....	June 15	July 5	10	10	10	l	r	9
Livingstone.....	June 16	July 6	10	10	9	l	r	9
Lovett.....	June 16	July 1	9	10	8	m	r	9
Nemaha.....	June 20	July 10	10	10	10	l	r	8
Ohio.....	June 17	July 1	10	10	8	m	r	9
Palmer (Acma).....	June 13	July 1	10	10	7	m	r	9
Pioneer (Progress).....	June 13	July 1	10	10	8	l	re	9
Souhegan.....	June 9	July 1	9	10	8	l	re	9

BLACKBERRIES.

On soil underlaid with gravel, as is the case with the Station farm, we can never be certain of a blackberry crop until it is harvested. This season, however, the crop was cut short by an excessive amount of rain while the plants were in bloom, thus interfering with a proper fertilization of the blossoms.

Following is the record for the season of 1900 in tabular form:

TABLE OF VARIETIES OF BLACKBERRIES.

VARIETY.	First Ripe.	Last Picking.	Vigor of Plant.	Hardi- ness.	Pro- ductive- ness.	Size.	Quality.
Rubus Villosus.							
Admiral	July 5	July 21	9	10	7	l	8
Agawam	July 3	July 21	9	10	7	l	9
Ancient Briton	July 5	July 21	9	10	8	m	8
Early Harvest	June 30	July 10	7	5	5	s	9
Early King	June 30	July 10	8	8	6	l	9
Eldorado	July 8	July 22	10	10	8	m	10
Erie	July 7	July 23	10	9	8	l	10
Gainor	July 6	July 20	9	10	5	m	9
Hoosier	July 6	July 20	9	10	8	l	9
Kittatinny	July 4	July 20	10	10	8	l	9
Minnewaski	July 8	July 20	10	10	7	l	9
Ohmer	July 6	July 18	9	10	7	l	9
Piazza	July 7	July 20	8	9	8	m	9
Snyder	July 6	July 20	10	10	8	m	9
Stone Hardy	July 8	July 20	9	9	6	m	8
Taylor	July 3	July 17	9	10	7	m	10
Wachusett	July 7	July 20	9	10	7	l	9
Western Triumph	July 7	July 20	10	10	9	m	6
Dewberries—Rubus Canadensis							
Lucretia	June 3	July 12	9	10	6	l	10

For the family garden the following varieties will do as well as any: Agawam, Early King, Erie, Snyder and Taylor. Lucretia is the only dewberry recommended for general cultivation.

Bulletin No. 84, Vol. X, September, 1900.

GROWING LETTUCE WITH CHEMICAL FERTILIZERS.

WILLIAM STUART.

The subject of lettuce culture with chemical fertilizers was undertaken by the writer some years ago, and has been continued as circumstances permitted up to the present time. The investigation has been carried out as a part of the work of the Botanical Department of the Station and under the supervision of Dr. Arthur, the Station Botanist, to whom the writer is much indebted for assistance.

The initial experiments on lettuce were reported in Bulletin 66 of this Station, and a brief account of some later ones is contained in an article by the writer, entitled "Plant Growing with Chemical Fertilizers"¹ which

¹ Transactions of the Indiana Horticultural Society: 105-114, December, 1896.

was read before the State Horticultural Society in December, 1898. Subsequent experiments to the ones already reported, as mentioned, confirm the results previously obtained and contain much additional information concerning the effects of various forms of fertilizers.

Questions Investigated.—Among some of the more important questions investigated and reported in this bulletin are the following:

1. The determination of the relative effects of phosphoric acid, nitrogen and potash upon the plants, either when used separately or in combination with each other.

2. The relative efficiency of phosphoric acid, nitrogen and potash when derived from different sources.

3. The comparative efficiency of chemical fertilizers and stable manure.

4. Relative availability of liquid chemicals when applied to the surface of the soil or from below.

5. A comparison of surface versus subwatering.

Soil Used and Its Preparation.—With the exception of the first experiment, the soil used was a black loam obtained from plants which were known to be reasonably deficient in plant food, a poor soil being essential in order to observe the effects of the chemical fertilizers employed.

In preparing the soil for the bench or pot, considerable pains was taken in order to insure uniform conditions throughout. The soil was passed through an eighth-inch wire mesh screen and then thoroughly mixed by shoveling it over two or three times. In filling the divisions of the bench, an equal quantity of soil by measurement was added to each, while in the case of the pots the same quantity by weight was taken. By this method it is apparent that little variation in either texture, quality or quantity of the soil could occur.

Method of Handling Plants.—In all trials the seeds were sown in flats (shallow boxes), and when the seedling plants were of sufficient size usually when the first true leaf was formed, they were potted off in more than sufficient numbers into two-and-one-half-inch pots. When the plants had become large enough those of a uniform size were selected and transferred to the benches or pots in which they were to be grown. In this way they sustained no check and were at once able to make use of the available plant food contained in the soil.

When the plants in the sections or pots containing the food most suitable to their growth reached the proper degree of development they together with all those in the other sections or pots were cut and weighed.

In cutting off the plants all were severed from their roots just a trifle beneath the surface of the soil in order to secure uniformity.

With the exception of the initial experiment, but one variety of lettuce was grown, that of the Grand Rapids, this variety having proved much more acceptable for experimentation than that of the White-Seeded Tennis-ball.

Resume of Initial Experiments.—As the results obtained from the initial experiments were published in Bulletin 66, but a brief outline of the work will be given. The first experiment (A) was conducted on one of the greenhouse benches during the winter of 1895-96. Chemical fertilizers were adapted to the soil in which the plants were potted from the seed flat. When these plants were of sufficient size they were plunged pot and all into a bench filled with rotted sod to which had been added about one-fourth its bulk of manure. As a result of the rich soil, the effects of the fertilizers were too obscure to possess any value, hence they are not presented.

TABLE I.—POTASH SERIES.

FERTILIZERS USED IN EXPERIMENT I. 1896-97.

KIND OF FERTILIZER.	AMOUNT IN GRAMS, PER SECTION.						Rate per Square Yard.
	I.	II.	III.	IV.	V.	VI.	
Muriate potash	none.	119.936	119.936	119.936	119.936	none.	3.4 oz.
Nitrate soda	none.	none.	175.679	none.	175.679	none.	4.9 oz.
Dissolved boneblack	none.	none.	none.	175.679	175.679	none.	4.9 oz.

Potash Series.—In the next experiment (I), conducted during the winter of 1896-97, the bench used was divided into six sections, which for convenience were numbered from I to VI. These were filled with the black soil previously mentioned, and instead of applying the fertilizers as in the preceding experiment, they were applied directly to the soil in the bench, and thoroughly incorporated with it. The fertilizers added to each section and their approximate rate per square yard are given in Table I. This is what is commonly known as a potash series, in that potash was used separately as well as in combination with each of the others.

The crop was harvested when the plants in sections IV and V had apparently reached their maximum development. The average weight of the plants grown in each section present an interesting study, in that the results are so widely variant. The product from sections I and VI, to which no fertilizer had been added, was assumed to be the normal increase from the soil, and any variation from that product should be directly attributable to the fertilizer added. The data presented in Table II represents the average weight of a plant from each section. The results show conclusively: First, that muriate of potash when used alone in considerable amount, was positively injurious to the growth of the plants; second, that when nitrate of soda was used in connection with the muriate of potash, still more harmful results were produced. The addition of the dissolved boneblack to the muriate of potash produced conditions highly

favorable to the growth of the plants. When all three ingredients were used, the results were even more satisfactory. A second crop grown upon the same soil without additional fertilizers corroborated the results of the first crop.*

TABLE II.—POTASH SERIES.

AVERAGE WEIGHT IN GRAMS OF PLANTS IN EXPERIMENT I.

Number of Group.	Average Weight.	Per Cent. of	Fertilizer Used.
I and VI	22.66	.....
II	19.83	— 12.5*	Muriate potash.
III	11.05	— 51.2*	Muriate potash, nitrate soda.
IV	79.60	+ 211.56	Muriate potash, dissolved boneblack.
V	82.29	+ 263.15	Muriate potash, dissolved boneblack, nitrate of soda.

* Erroneously given in bulletin 66, p. 42, as —14.27 per cent. and —105.07 per cent.

Subsequent Experiments.—As a result of the information obtained from the preceding experiment, in all subsequent ones, phosphoric acid was assumed to be an essential factor in lettuce culture, and so it entered into all combinations of other ingredients. These experiments include one other in the greenhouse and four more which were conducted in the zinc pots of the "Vegetation House." In all of them good results were obtained.

TABLE III.—PHOSPHORIC ACID SERIES.

FERTILIZERS USED IN EXPERIMENT II, 1897-98.

KIND OF FERTILIZER.	AMOUNT IN GRAMS PER SECTION.						Rate in Ounces per Square Yard.	Per Cent. of Available Plant Food.
	I and VII.	II.	III.	IV.	V.	VI.		
Dissolved boneblack..	None.	156.159	156.159	156.159	156.159	156.159	4.9	16. P.O.
Muriate potash c. p. . .	None.	None.	65.809	None.	None.	65.809	2.1	63.2K ₂ O
Sulphate potash c. p. . .	None.	None.	None.	56.408	None.	None.	1.9	54.1K ₂ O
Nitrate soda c. p.	None.	None.	None.	None.	76.175	76.175	2.4	.4N

* For fuller details concerning these experiments the reader is referred to bulletin 66 of this Station.

* The "Vegetation House" is a glass structure especially constructed for summer experimentation, and is not provided with artificial heat, being simply intended for protecting the plants from storms and early or late frosts. The pots in which the plants are grown are placed on movable trucks, the latter being run out doors on all favorable occasions.

PLATE I.

Purdue Experiment Station.



EXPERIMENT II.

- A. Photograph of bench four days after setting the plants.
B. Photograph of bench just before harvesting the plants.

Phosphoric Acid Series.—In this experiment (II) no material changes were made in the general method of conducting the work. A slight change was made in the bench, the number of divisions being increased from six to seven, and the sulfate of potash added to the list of chemical ingredients used. There was also a material reduction in the amount of nitrate of soda and potash used. The potash compounds were reduced one-third and the nitrate of soda one-half. Only one-fourth of the nitrate of soda was applied to the soil in Section V, prior to setting out the plants, the balance being applied in two installments during the period of growth.

The grouping of the fertilizers and the amounts used in each section are given in Table III, and also the percentage of phosphoric acid, potash and nitrogen in the different chemicals.

The lettuce seed was sown December 13, potted off January 11, and transferred to the bench February 5. On February 9 the bench was photographed (see Plate I, A). Measurements were made of the average length and width of leaves on March 11. These measurements, which are presented in Table IV, while not showing any very marked increase between those receiving fertilizers, do show a decided increase over the control plants or those to which no fertilizers were added. The percentage of increase varied in the case of the length of the leaf from over 19 to almost 25 per cent., while in the breadth of leaf it varied from over 17 to over 28 per cent. On harvesting the crop, which was done April 1st and 2d, the increase of the fertilized plants over those which were not, was found to be considerably greater than that indicated by the leaf measurements. A photograph which was taken of the bench just prior to harvesting the plants, is shown in Plate I, B. The weight of each plant was taken and the average weight of the plants in each section computed therefrom.

TABLE IV.—PHOSPHORIC ACID SERIES.

AVERAGE LENGTH AND BREADTH OF LEAVES, MARCH 11.

Number of Section.	Average Length of Leaves.	Average Breadth of Leaves.	Per Cent. of Increase in Length.	Per Cent. of Increase in Breadth.
I and VII	5.05 inches	4.30 inches		
II	6.02 "	5.16 "	19.21	20.00
III	6.25 "	5.14 "	23.76	19.53
IV	6.37 "	5.04 "	26.14	17.23
V	6.31 "	5.22 "	24.96	21.40
VI	6.28 "	5.51 "	24.55	28.14

From the data obtained, which is found in Table V, the reader will observe that as in the case of the leaf measurements the average weight of the plants from Sections II-IV are remarkably uniform. A comparison of the results obtained from the two forms of potash used, that of the

muriate and sulfate, shows an increase of nearly 12 per cent. in favor of the muriate. The available potash in the amounts of each of the two ingredients was supposed to be the same at the time the application was made, a supposition which was found to be incorrect when too late to remedy it.

Through some unaccountable means the amounts added were reversed; that is, the greater amount or 65.809 grams should have been of the sulfate of potash and vice versa, the lesser of muriate.

Whether or not the increase of the product from III over that of IV is wholly due to this cause, the writer is unable to say. If we consider the amounts used in each case to be considerably in excess of the needs of the plant, which is altogether probable, then we may assume the increase to be due to the superiority of the muriate over the sulfate for lettuce culture.

TABLE V.—PHOSPHORIC ACID SERIES.
AVERAGE WEIGHT OF PLANTS IN GRAMS, EXPERIMENT III, 1898.

Number of Section.	Average per Plant.	Per Cent. Increase Over Control.	Fertilizers Used.
I and VII...	87.4 grams..	.....	None.
II...	120.8 " ..	38.10	Dissolved boneblack.
III...	133.7 " ..	52.97	Dissolved boneblack, muriate potash.
IV...	123.4 " ..	41.19	Dissolved boneblack, sulphate potash.
V...	134.6 " ..	54	Dissolved boneblack, nitrate soda.
VI...	139.2 " ..	59.27	Dissolved boneblack, nitrate soda, muriate potash.

The material increase of Section II over the control sections shows that the inferences deducted from experiment I in regard to the essentiality of phosphoric acid in growing lettuce is well exemplified. But little difference is to be noted between Sections III and V, to the one of which muriate of potash had been added and to the other nitrate of soda. The addition of all the ingredients only netted an increase of a little over 5 per cent. as compared with the last two mentioned.

POT EXPERIMENTS.

In order to make a further study of the relative merits of muriate and sulfate of potash as a potash medium, in which the amounts applied should represent exactly the same theoretical content of potassium oxide (K_2O), another experiment (III) was undertaken. In this experiment, besides comparing the two potash sources mentioned, a comparison was also made as to the relative merits of raw bone meal and a soluble dissolved

bone, as a phosphoric acid source. The work which was conducted in the zinc pots of the vegetation house, was performed during the spring of 1898 and very closely succeeded that of experiment III in the greenhouse. The lettuce seed was sown April 5, the seedlings potted off April 29 and transferred to the zinc pots May 20. Twenty-one pots were used and these were divided into seven groups of three pots each, containing two plants to each pot. The zinc pots used were 10 inches in diameter and about the same in depth, and were provided with a device for sub-watering (see Plates II and III), water being poured into the zinc spout and entering the pot by means of a half-inch hole through its side. To prevent the soil from clogging this hole and to facilitate the distribution of the water, an inverted trough-shaped strip of zinc extended across the bottom of the can from the hole to the opposite side. The bottom of the can inside was filled to the top of this trough with medium coarse gravel and then filled with a weighed quantity of soil.

TABLE VI.—PHOSPHORIC ACID AND POTASH TESTS.

FERTILIZERS USED IN EACH GROUP EXPERIMENT III.

KIND OF FERTILIZER.	AMOUNT IN GRAMS PER POT EACH GROUP.							Ounces Per Square Yard.	Per Cent. Available Phosphoric Acid.
	I.	II.	III.	IV.	V.	VI.	VII.		
Raw bone.....	none.	41.095	none.	41.095	41.095	41.095	41.095	24.8	5.31
Soluble dis. bone*	none.	none.	17.415	none.	none.	none.	none.	10.5	12.53
Nitrate soda c. p..	none.	none.	10.709†	none.	none.	6.136†	6.136†	3.7	.....
Mur. potash c. p..	none.	none.	none.	none.	3.917	none.	3.917	2.5	.....
Sulph. potash c. p.	none.	none.	none.	4.579	none.	4.579	none.	2.8	.....

Fertilizers Applied.—The fertilizers applied to each group, together with the amounts per pot and per square yard, are given in Table VI. In order to make the "soluble dissolved bone" comparable with the raw bonemeal, which contained 4.27 per cent. of nitrogen, it was necessary to supply to the dissolved bone an amount of nitrogen equal to that contained in the raw bonemeal. This was accomplished by adding nitrate of soda.

*The "soluble dissolved bone" as it was called by the dealer, contained no nitrogen and in all probability was a dissolved rock instead of bone. It is erroneously termed an acidulated bone in my article on "Plant Growing with Chemical Fertilizers," l. c. p. 110.

†One-half the amount of nitrate of soda was applied to the soil previous to setting the plants, the balance in two installments in the case of group III and of one in groups VI and VII. These applications were made in liquid form during the growth of the plant.

Harvesting Plants.—The plants were cut and weighed when those making the best growth had attained full development. Photographs taken of some of the plants at this time are shown in Plates II and III. The average weights of the product from each pot of the different groups are presented in Table VII.

These results show a marked increase in all cases over that of the control group, the increase varying from 132 to 233 per cent. The "soluble dissolved bone" gave a slight increase, less than 4 per cent., over that of the raw bone meal, showing that either source of phosphoric acid was suitable to use for lettuce, provided the nitrogen content be made the same.

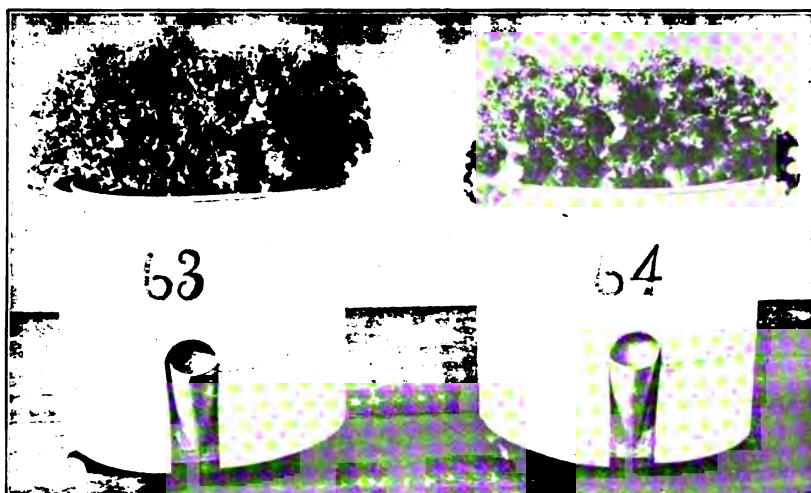
The muriate of potash gave but little better results than did the sulfate, either in combination with the raw bone meal alone or with the addition of nitrate of soda to the bone meal. The percentage of increase in the former instance over the sulfate was a little over 4 per cent., and in the latter case of less than two per cent. This would indicate that the results obtained in experiment II, Table V, should be regarded as being possibly influenced by the increased amount of the muriate applied to the soil.

The addition of nitrate of soda and potash either separately or conjointly to the raw bonemeal, produced as in the case of the dissolved bone black (experiment II), a very material increase over the raw bone meal alone.

TABLE VII.—PHOSPHORIC ACID AND POTASH TESTS.

AVERAGE WEIGHT OF LETTUCE PER POT FROM EACH GROUP. EXPERIMENT III.

Number of Group.	Average Weight in Grams Per Pot.	Per Cent. of Increase Over Control.	Fertilizer Used.
I	164	132	None.
II	381	141	Raw bonemeal.
III	395	158	"Soluble dissolved bone," nitrate soda.
IV	423	170	Raw bonemeal, sulphate potash.
V	442	229	Raw bonemeal, muriate potash.
VI	539	233	Raw bonemeal, sulphate potash, nitrate soda.
VII	546		Raw bonemeal, muriate potash, nitrate soda.



Sub versus surface watering.

63. Sub-watered.

64. Surface-watered.



Comparison of raw bonemeal alone and with muriate potash.

68. Raw bonemeal.

113. Raw bonemeal and muriate potash.

POT EXPERIMENT III.



63. No fertilizers.
66. Raw bonemeal.



68. Raw bonemeal.
119. Raw bonemeal, muriate potash and nitrate of soda.

POT EXPERIMENT III.

CHEMICAL FERTILIZERS VERSUS ROTTED STABLE MANURE EXPERIMENTS.

Wishing to ascertain the relative efficiency of chemical fertilizers as compared with the stable manure, three more experiments were conducted along these lines, IV, V and VI. The first of these, or experiment IV, was conducted in the zinc pots used for the preceding experiment during the spring of 1899. In every respect it was conducted similarly to those preceding it, both in the preparation of the soil and the handling of the plants. The chemical fertilizers used were nearly the same as those in experiment III, except that an acid phosphate was substituted for the "soluble dissolved bone," and the use of sulfate of potash was discontinued.

The fertilizers applied and the combinations made are presented in Table VIII.

Only one-third of the nitrate of soda (3.570 grams) was applied to the soil previous to setting the plants, and one-half of the muriate of potash. The balance of the former was intended to be made in liquid form in two applications, and of the potash in one application.

The soil enriched with manure was a rich potting soil, consisting of rotted sod, to which about one-fourth its bulk of manure had been added.

In this experiment but one plant was grown in each pot, these being transferred to the pots May 27.

TABLE VIII.—CHEMICALS AND MANURES.

FERTILIZERS USED IN EACH GROUP. EXPERIMENT IV.

KIND OF FERTILIZER.	AMOUNT IN GRAMS PER POT IN EACH GROUP.						
	I.	II.	III.	IV.	V.	VI.	VII.
Raw bonemeal.....	none.	none.	51.095	none.	none.	none.	none.
Acid phosphate.....	none.	none.	none.	17.415	17.415	17.415	17.415
Nitrate soda.....	none.	none.	none.	none.	7.140*	none.	7.140*
Muriate potash.....	none.	none.	none.	none.	none.	3.917	3.917
Rotted manure.....	none.	manure.	none.	none.	none.	none.	none.

* 7.140 grams is the amount actually applied, 10.709 grams was the amount intended to be used, but on account of the rapid maturity of the plants the last application was not made.

Owing to the exceeding warm weather of the early part of June, the plants began to send up seed stalks before they had attained full size, thus necessitating the harvesting of the crop. This was done June 16, or about three weeks from the time the plants were set in the pots. For this reason the last application of nitrate of soda was not made to the plants, hence as mentioned in the foot note, the actual amount added was

one-third less than intended, or only 7.140 grams, instead of 10.709, which was the theoretical amount of nitrate of soda required to offset the nitrogen contained in the bone used. The increased product from the plants receiving raw bone meal over those to which the acid phosphate and nitrate of soda were added, would seem to indicate that the decrease in the latter was due to the lack of nitrogen rather than of phosphoric acid. Owing to these circumstances the actual value of the experiment is very much lessened. It is believed, however, that the results obtained are in some measure at least indicative of the plant food supplied. A study of Table IX will show an increase of the bone meal over the rich potting soil of over 7 per cent. This increase being all the more remarkable on account of the fact that the phosphoric acid of the bone is only slowly available to the plant, hence it could not have made use of any considerable amount of it.

TABLE IX.—CHEMICALS AND MANURE.

AVERAGE WEIGHT OF PLANTS IN EACH GROUP. EXPERIMENT IV.

Number of Group.	Average Weight of Plant in Grams.	Per Cent of Increase Over Control.	Fertilizers Used.
I	48	.....	None.
II	157.7	229.—	Manure.
III	169.3	253.—	Raw bonemeal.
IV	110	129.—	Acid phosphate.
V	135	181.—	Acid phosphate, nitrate soda.
VI	122	154.—	Acid phosphate, muriate potash.
VII	153.3	219.—	Acid phosphate, muriate potash, nitrate soda.

The raw bone meal also gave a very marked increase over the acid phosphate, either alone or in any of its combinations. This increase varied from about 54 per cent. in the case of acid phosphate alone to 10 per cent. in that of group VII. The decrease of product from Group V, having acid phosphate and nitrate of soda, is probably largely due to the fact that it did not receive its full amount of nitrate of soda, because in the preceding experiment little difference was observed in the two sources of phosphoric acid.

In experiment V some changes were made in the grouping of the fertilizers as well as in the soil enriched with manure. The soil used for the latter was the same as that of the other groups in the experiment, there being added to it an equal amount of rotted manure. As in the preceding experiment but one plant was grown in a pot, and but one-third of the nitrate of soda and one-half the muriate of potash was added to the soil previous to setting the plants. The balance of the nitrate of soda was added in two equal amounts and that of the muriate of potash in one application.

TABLE X.

Number of Group.	Average Weight in Grams per Plant.	Per Cent. of Increase Over Control.	Fertilizers Used.
I	71.3	.....	None.
II	323	352.8	Rotted manure.
III	286	301.—	Acid phosphate, nitrate soda.
IV	259.7	264.—	Raw bonemeal.
V	287.3	302.9	Raw bonemeal, nitrate soda.
VI	306.3	332.6	Raw bonemeal, muriate potash.
VII	334	368.3	Raw bonemeal, muriate potash, nitrate soda.

The seed was sown August 16, 1899, the seedlings potted off August 30, the plants transferred to the pots September 13, and harvested October 27. During this period of about six weeks the growth of the plants was quite rapid owing to favorable temperature, the nights being cool and the days moderately warm. The average weight of the plants in each group shows a remarkable increase over those of experiment IV. These results, which are given in Table X, also show some changes; for example, a greater increase was obtained from the manure-enriched soil than from the raw bone meal alone, while the product of Group VII to which raw bone meal, muriate of potash and nitrate of soda had been added, slightly exceeded that of the soil and manure. The acid phosphate and nitrate of soda group gave an increase over that of raw bone meal alone, corroborating the results obtained in experiment III, and contradicting those of IV, which it will be remembered were at variance in some respects at least with those of preceding experiments.

TABLE XI.

Number of Group.	AMOUNT IN GRAMS.						Application of Liquid Fertilizer.
	Raw Bone-meal.	Acid Phosphate.	Nitrate of Soda, c. p.	Dried Blood.	Muriate of Potash, c. p.	Stable Manure in Bulk.	
I	none.	none.	none.	none.	none.	none.	
II	34.803	none.	none.	none.	none.	none.	
III	none.	18.683	8 063	none.	none.	none.	
III (a)	none.	18.693	none.	9.795	none.	none.	
IV	69.606	none.	none.	none.	none.	none.	
V	none.	37.366	16.126	none.	none.	none.	
V (a)	none.	37.366	none.	19.590	none.	none.	
VI	34.803	none.	9.—	none.	6.—	none.	sub.
VII	34.803	none.	9.—	none.	6.—	none.	surface.
VIII	none.	18.683	17.063	none.	6.—	none.	sub.
VIII (a)	none.	18.683	none.	20.751	6.—	none.	sub.
IX	none.	18.683	17.063	none.	6.—	none.	surface.
IX (a)	none.	18.683	none.	20.751	6.—	none.	surface.
X	none.	none.	none.	none.	none.	one-half.	
X (a)	none.	none.	none.	none.	none.	five-eighths.	

The principal features of the next experiment (VI) consisted in a further trial of chemical fertilizers and stable manure, and a comparison of the relative efficiency of dried blood as compared with nitrate of soda for a nitrogen conveyor. The dried blood was also used for the purpose of comparing its effect with that of the organic nitrogen of the raw bone; the dried blood being supplied to the acid phosphate. In estimating the amount of available phosphoric acid in the raw bone meal, a slightly different method was adopted, in that 30 per cent. of the total amount contained in the bone was assumed to be available.* In the previous experiments only the reverted phosphoric acid was considered available. Another feature of the experiment was in a comparison of surface and sub applications of liquid fertilizers, in the case of nitrate of soda and muriate of potash.

TABLE XII.
ANALYSES OF FERTILIZERS USED IN EXPERIMENT VI.

KIND OF FERTILIZER.	PER CENT. PHOSPHORIC ACID.					Per Cent. Nitrogen.
	Soluble.	Reverted.	Insoluble.	Total.	Total. Available.	
Raw bonemeal.....	none.	5.17	15.75	20.90	5.17	3.8
Acid phosphate.....	1.011	1.57	1.66	13.34	11.68	none.
Dried blood.....	none.	none.	none.	none.	none.	13.5

In order to carry out the above prescribed lines of work, it was necessary to use a much larger number of pots and to divide them into more groups. Eighty pots were used and these were divided into ten groups of eight each, five of the groups being divided into two for a comparison of the two forms of nitrogen. The pots used were a size smaller than those previously employed, being about seven and seven-eighths inches in diameter by nearly nine inches in depth. The fertilizers used in the different groups are presented in Table XI. As in previous experiments only a portion of the nitrate of soda and muriate of potash was applied to the soil at the outset, a third of the former being applied and one-half of the latter, the balance of the nitrate of soda being made in three applications, and that of the muriate of potash in one. In the last column of the table, those marked sub and surface mean those to which the balance of the nitrate of soda and muriate of potash in liquid form were either applied to the surface of the soil or by the subwatering method.

* It has been found by certain European investigators that about 60 per cent. of the total phosphoric acid in raw bonemeal is available the first year. In our experiments the period of growth was so short it was assumed that not over half that amount or 6.27 per cent. would become available to the lettuce plant.

TABLE XIII.

AVERAGE WEIGHT OF PLANTS FROM EACH GROUP. EXPERIMENT VI.

Number of Group.	WEIGHT IN GRAMS.		PER CENT. OF INCREASE.		Fertilizers Used.
	First Crop.	Second Crop.	First Crop.	Second Crop.	
I	159	59.9	.....	.....	None.
II	331.6	142	108.6	137.1	Raw bonemeal.
III	460	141.5	189.3	136.2	Acid phosphate, nitrate soda.
III (a)	398.5	138.3	160.6	130.9	Acid phosphate, dried blood.
IV	349.9	188.8	120.1	215.2	Raw bonemeal.
V	480.8	146.5	202.4	144.6	Acid phosphate, nitrate soda.
V (a)	449	148.5	182.4	147.9	Acid phosphate, dried blood.
VI	502	175.6	215.9	193.2	Raw bonemeal, nitrate soda, muriate potash (subwatered).
VII	431.3	190.9	171.6	218.7	Raw bonemeal, nitrate soda, muriate potash (surface).
VIII	480.5	119	202.2	98.7	Acid phosphate, nitrate soda, muriate potash (subwatered).
VIII (a)	459.5	189.5	189	216.4	Acid phosphate, dried blood, muriate potash (subwatered).
IX	403.5	129.3	153.8	115.9	Acid phosphate, nitrate soda, muriate potash (surface).
IX (a)	411.8	194	159	223.9	Acid phosphate, dried blood, muriate potash (surface).
X	233.3	171.8	65.6	186.8	One-half manure.
X (a)	256.7	255.7	61.5	326.9	Five-eighths manure.

Analyses of the raw bone meal, acid phosphate and dried blood, used in this experiment were made by the Assistant State Chemist, W. J. Jones, and showed them to contain the following percentages of phosphoric acid and nitrogen. (See Table XII.)

Plants.—The seed was sown February 16 in the greenhouse and the plants potted off March 2 and transferred to the zinc pots April 2, a week later than was desired, the delay being occasioned by cold weather. The plants, with the exception of those in the manure-enriched soil, made a good growth and were harvested from the 14th to the 18th of May, an equal number of plants being removed from each group on the 14th, 17th and 18th.

Second Crop.—In order to learn to what extent the available plant food of the fertilizers had been removed by the first crop, it was decided to grow a second crop in the same soil. The soil was merely worked over and pulverized in the pots, and a second lot of lettuce set in it May 22 and harvested June 15. The results obtained from this crop along with that of the first are presented in Table XIII.

Availability of Nitrogen.—In the first crop the nitrate of soda, wherever comparable conditions obtained, gave slightly better results than the dried blood, the increase varying from 4.5 to 15 per cent. The results of the second crop showed a slight gain in favor of nitrate of soda in one instance, and in two others a gain in favor of the dried blood. In one of

these, VIII (a), the gain over VIII was large on account of the fact that the product from the latter was much less than it should have been, and owing to this, no definite conclusion can be derived from the second crop. It is safe to infer, however, from the results of the first harvest, that for any quick growing crops, or where an application of nitrogen is desirable in the maturing of a crop, the nitrate of soda is preferable to dried blood.

Liquid Fertilizers.—In comparing the merits of the surface and sub-applications of liquid fertilizers, the results of which are shown in Groups VI and VII, and in VIII and IX, they are found to be wholly in favor of the subwatering method for the first crop, while in the second one they are reversed. The reason for this change is probably due to the fact that the liquid fertilizers applied to the surface did not sink deeply enough into the soil to reach the young rootlets of the plant, in the first crop, whereas in the second, the soil having been pulverized and worked over in the pot, the chemicals applied to the surface which were not at first in a position to be used by the plant, were then made available. The inference to be deduced from this seems to be that where the total moisture is supplied the plant from below, liquid fertilizers applied in the same manner will give the best results.

Raw Bone and Acid Phosphate.—A comparison of Groups II and III shows that the acid phosphate and nitrate of soda was superior to the raw bone meal alone in the first crop, while they were about the same in the second. In the first instance the increase was nearly 38 per cent. That this gain is probably more largely due to the greater availability of the nitrogen in the nitrate of soda than in that of the organic form in the bone, is borne out by the fact that Group IV, to which a double amount of raw bone meal was added, did not give as large a yield as II, and Group V, to which a double amount of acid phosphate and nitrate of soda were added, gave a somewhat larger yield than III. The second crop shows the yield of II and III practically the same, while IV shows a gain of nearly 29 per cent. over that of V, and of 33 per cent. over that of III. That the yield from the raw bone groups was greater than those of the acid phosphate groups, in the second crop, shows that the former is more valuable when used on soil in which crops are grown for some length of time. The question as to which is the more profitable to use depends upon the length of time the crop remains upon the soil and the relative cost to the consumer.

Chemical Fertilizers and Stable Manure.—In the first crop the plants to which chemical fertilizers were applied made a much better growth than those grown with stable manure. Comparing the product from Group VI, to which raw bone meal, nitrate of soda and muriate of potash had been added, with those of the two manure groups, X and X (a), we find an increase of 90 and 95 per cent. respectively, in favor of the raw bone group. A comparison of the second crop, however, shows the product from VI and X to be nearly the same, while that from X (a) is nearly

46 per cent. greater. The yields of the two crops from X (a) which are practically the same, indicates the lasting effect of stable manure. If we consider the total average product of the two crops from VI and X (a), we find them to be 677.6 and 512.4 grams respectively, or an increase in favor of the former of over 32 per cent. That the results of three experiments should have shown an increase in favor of chemical fertilizers over stable manure in lettuce culture is a good indication that the former when judiciously used are capable of producing a maximum crop.

Advantages and Disadvantages of Chemical Fertilizers.—That chemical fertilizers possess some advantages over stable manures, I think none will deny. Some of these advantages may be briefly summed up as follows:

1. They are not so bulky, hence the cost of handling is very much lessened.

2. They may be so combined as to contain approximately the right amount of the three elements essential to produce a maximum crop, hence they may be termed a more balanced plant food than stable manure.

3. They are not so conducive to the growth of fungous diseases in the forcing house as is stable manure.

The disadvantages, if such they may be termed, are practically none to one familiar with their use; to the uninitiated they might be legion. The principal disadvantages would, I think, be included in the following list:

1. A too liberal use of chemical fertilizers is almost certain to prove disastrous to the growth of the plants, hence the novice is either deterred from using them, or else in using them does not take into account the fact that they are such highly concentrated plant food and thereby ruins his crop.

2. Their cost is sometimes a serious drawback to their use. Especially is this true when stable manure may be had for the hauling.

3. They do not, as a rule, improve the mechanical condition of the soil.

Where stable manure can be procured at little cost, it may not be advisable to discontinue its use in the forcing house, but it is believed that even then the addition of some form of phosphate and potash to the manure will enhance its value to the plants.

So far as known to the writer, the only experiment conducted with lettuce in which comparison was made between chemical fertilizers and stable manures, is that of Beach^a of the New York Experiment Station. In this experiment a trial was made on sandy and clayey loams, between chemical fertilizers and stable manure. The chemical fertilizers gave the best results on the sandy loam and the poorest on the clay. The author explains the results as follows: (l. c. p. 152.) "A heavy application of stable manure to the sandy loam put the soil in poor mechanical condition and a crop of inferior lettuce resulted." "The mechanical condition

^a Beach, Bull. 146, N. Y. Agr. Ex. Sta., Geneva, 152, 172-179, 1898.

of the clay loam was improved by a heavy application of stable manure. The mixture produced much better lettuce than was grown on the clay loam where commercial fertilizers were used instead of stable manure."

TABLE XIV.

AVERAGE WEIGHT OF PLANTS FROM SURFACE AND SUBWATERED PLANTS.

NUMBER OF EXPERIMENT.	Surface Watered, in Grams.	Subwatered, in Grams.	Per Cent. Increase Over Surface Water.
III	61.2	82	34
IV	34.7	48	38
V	59.7	71.3	19

As a soil of medium texture was used by the writer, these conditions did not obtain, and therefore the results of experiments in the two localities are not comparable.

Surface and Subwatering.—Although the plants in all the experiments heretofore mentioned received their water supply by the subwatering system, a few plants grown in connection with experiments III, IV and V were surface watered. The conditions under which the two groups of plants were grown were as nearly identical as it was possible to obtain, the only difference being in the method of supplying water. The results obtained from these plants, which are given in Table XIV, show quite conclusively the superiority of the subwatering method over that of the surface. The increase varied from 19 to 38 per cent. in favor of the subwatered plants. These results are well within the bounds of those obtained by other investigators* in which the increase varied from 25 to 100 per cent.

SUMMARY.

The results obtained from the several experiments enumerated seem to invite the following conclusions:

1. That in order to study the action of the three essential elements of plant food, nitrogen, phosphorus and potassium, a soil must be used that is fairly deficient in plant food.

2. That potash when used in any considerable amount either alone or in connection with nitrate of soda, produced conditions unsuitable to plant growth.

3. When phosphoric acid was used alone or in connection with nitrate of soda or muriate of potash, even in large amounts, a marked increase in the growth of the plants was obtained.

* Green, W. J. and E. C., Bull. 61, Ohio Agr. Ex. Sta., 75, 1895.

Rane, F. W., Bull. 33, West Virginia Agr. Ex. Sta., 264, 1893.

Goff, E. S., and Craneheld, F., 13th An. Rep. Wisconsin Agr. Ex. Sta., 247, 1896.

4. The muriate of potash proved somewhat superior to the sulfate, the increase in each case being but slight.

5. But little difference seems to obtain in the efficiency of different forms of available phosphoric acid.

6. In each instance chemical fertilizers proved slightly superior to stable manures.

7. The application of liquid fertilizers from below by the subwatering method proved perfectly feasible and gave satisfactory results.

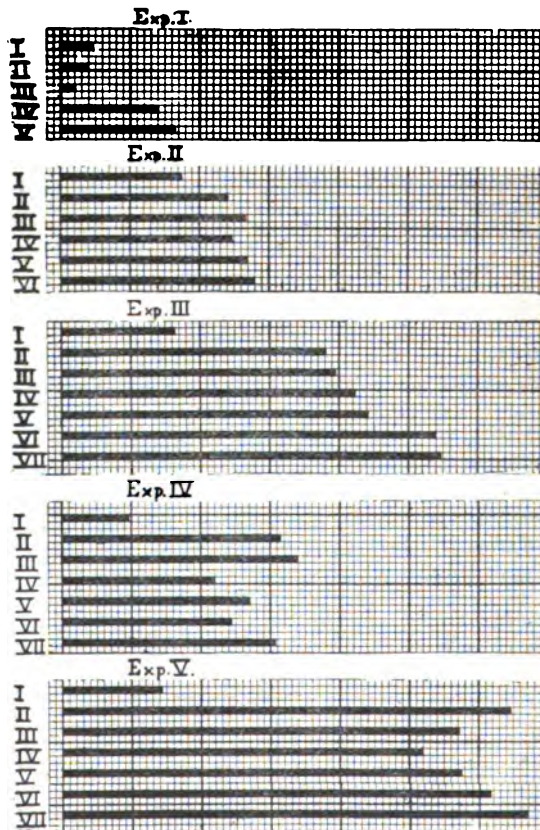
8. Nitrate of soda gave quicker returns than did dried blood, and seems best adapted to lettuce culture.

9. The subwatered plants made a better growth than the surface-watered ones.

GRAPHIC CHARTS.

The graphic charts contained in the bulletin represent the comparative yields from each experiment. Each square of the cross section paper traversed by the dark lines represents five grams of the average weight of the plants from that group or section. Wherever possible, the results of different tests are grouped together, as, for example, that of the stable manure and chemical fertilizers, the sulphate and muriate of potash, surface and subwatering. In this way it is hoped that the results will be more readily understood by the reader.

GRAPHIC CHART I.

**EXP. I. POTASH SERIES IN BENCHES.**

- I. No fertilizers.
- II. Muriate potash.
- III. Muriate potash, nitrate soda.
- IV. Muriate potash, dissolved boneblack.
- V. Muriate potash, dissolved boneblack, nitrate soda.

EXP. II. PHOSPHORIC ACID SERIES IN BENCHES

- I. No fertilizers.
- II. Dissolved boneblack.
- III. Dissolved boneblack and muriate potash.
- IV. Dissolved boneblack and sulphate potash.
- V. Dissolved boneblack and nitrate soda.
- VI. Dissolved boneblack, nitrate soda and muriate potash.

EXP. III.* SULPHATE VERSUS MURIATE POTASH.

- I. No fertilizers.
- II. Raw bonemeal.
- III. Soluble dissolved bone and nitrate soda.
- IV. Raw bonemeal and sulphate potash.
- V. Raw bonemeal and muriate potash.
- VI. Raw bonemeal, sulphate potash and nitrate soda.
- VII. Raw bonemeal, muriate potash and nitrate soda.

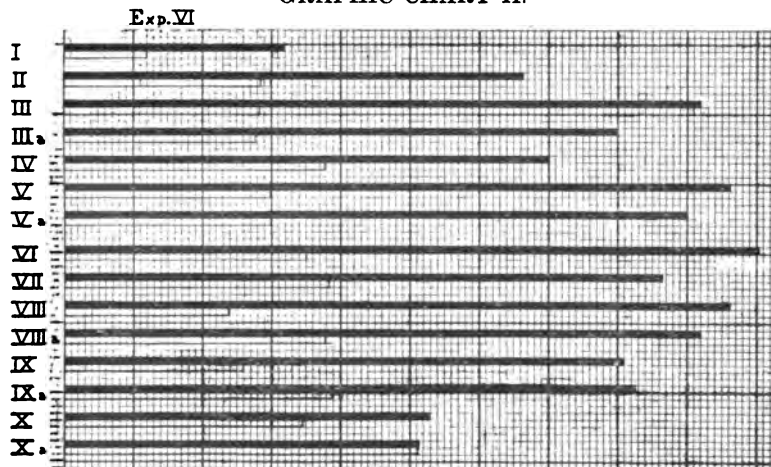
EXP. IV. CHEMICAL FERTILIZERS VERSUS STABLE MANURE

- I. No fertilizers.
- II. Rich potting soil.
- III. Raw bonemeal.
- IV. Acid phosphate.
- V. Acid phosphate and nitrate soda.
- VI. Acid phosphate and muriate potash.
- VII. Acid phosphate, muriate potash and nitrate soda.

EXPERIMENT V.

- I. No fertilizers.
- II. One-half manure.
- III. Acid phosphate, nitrate soda.
- IV. Raw bonemeal.
- V. Raw bonemeal and nitrate of soda.
- VI. Raw bonemeal and muriate potash.
- VII. Raw bonemeal, muriate potash and nitrate soda.

GRAPHIC CHART II.

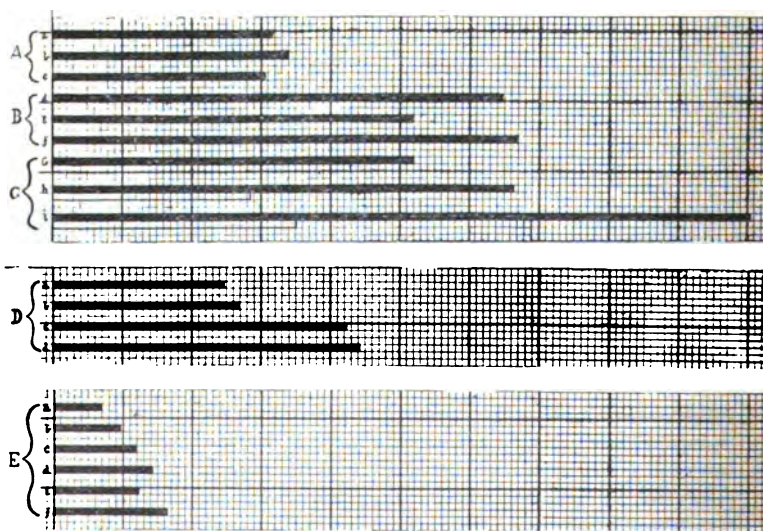


* In this experiment the graphic lines represent the average weight of the plant, and not the average weight of product from the pots in the group. To make them comparable to the tables they should be multiplied by two.

Experiment VI. Chemical fertilizers versus stable manure, organic versus inorganic forms of nitrogen, surface and subapplication of liquid chemical fertilizers. The heavy black lines represent the first crop, while the unshaded ones beneath them represent the second.

- I. No fertilizer.
- II. Raw bonemeal.
- III. Acid phosphate and nitrate soda.
- IIIa. Acid phosphate and dried blood.
- IV. Raw bonemeal (double amount).
- V. Acid phosphate and nitrate of soda (double amounts).
- Va. Acid phosphate and dried blood (double amounts).
- VI. Raw bonemeal, nitrate soda and muriate of potash (sub-application).
- VII. Raw bonemeal, nitrate soda and muriate potash (surface application).
- VIII. Acid phosphate, nitrate soda and muriate potash (sub-application).
- VIIIa. Acid phosphate, dried blood and muriate potash (sub-application).
- IX. Acid phosphate, nitrate soda and muriate potash (surface application).
- IXa. Acid phosphate, dried blood and muriate potash (surface application).
- X. One-half stable manure.
- Xa. Five-eighths stable manure.

GRAPHIC CHART III.



A, B AND C. CHEMICAL FERTILIZERS VERSUS STABLE MANURES.

- a. Rich potting soil, exp. IV.
- A { b. Raw bonemeal, exp. IV.
- c. Acid phosphate, nitrate soda and muriate potash, exp. IV.
- d. One-half manure, exp. V.
- B { e. Raw bonemeal, exp. V.
- f. Raw bonemeal, nitrate soda, muriate potash, exp. V.

- C { g. Over one-half manure, average of X and Xa, in exp. VI.
 h. Raw bonemeal, II, in exp. VI.
 i. Raw bonemeal, nitrate soda, muriate potash, VI, in exp. VI.

D. SULPHATE VERSUS MURIATE POTASH.

- D { a. Sulphate potash, exp. II.
 b. Muriate potash, exp. II.
 c. Sulphate potash, exp. III.
 d. Muriate potash, exp. III.

E. SURFACE AND SUBWATERING.

- E { a. Surface watered.
 b. Subwatered.
 c. Surface watered.
 d. Subwatered.
 e. Surface watered.
 f. Subwatered.

Bulletin No. 85, Vol. X, October, 1900.

CHRYSANTHEMUM RUST.

J. C. ARTHUR.

The outbreak of chrysanthemum rust, which has attracted much attention in the last two or three years, presents features that are of interest not only to growers of this popular flower but to every one who cares to be informed regarding a class of parasitic fungi preying upon cultivated crops of almost every kind and proving exceedingly harmful and difficult to control. The genuine rusts (*Uredineae*) are of many kinds and varied in their habits. All of them grow upon the living parts of plants only, and this intensely parasitic habit must be borne in mind to fully appreciate their characteristics.

A typical rust, as one may say, has three prominent sorts of spores: (1) the aecidiospores, usually some shade of yellow or orange, formed in little white cups, just large enough to be seen fairly well with a hand lens; (2) the uredospores, which are generally of a rusty yellow color and being produced in great abundance on the surface of leaves and stems give a semblance of iron rust and hence the name, now applied to the whole group, and (3) the teleutospores, which generally are dark brown, or black, and for the most part serve to carry the fungus over winter, being able to withstand considerable drouth and cold, or other adverse conditions. These three forms are sometimes spoken of as the first, second and third stages of the fungus. The asparagus rust, now rapidly

spreading over this country from east to west, has all three stages, the first stage appearing in spring and the others in summer and autumn.

In the case of the rust on the chrysanthemum an unusual condition exists, which is difficult if not impossible to account for at the present time. Only uredospores have yet been found in Europe or America. As the fungus is an annual, that is, it does not live from year to year in the tissues of the host plant, but dies with the falling or cutting away of the leaves, it is puzzling to see what security the fungus has against extermination during late winter and spring months when chrysanthemum plants are latent. A natural solution was to suppose that the rust is identical with one of the forms common on many wild plants, members of the composite family, and more or less closely related to the chrysanthemum. This solution seemed so inevitable that mycologists at once called the fungus *Puccinia Hier. accl.* or *Puccinia Tanacet.*, both names for a very abundant rust or probably more than one, found on a number of the most common weeds throughout the world. But no explanation was offered for the fact that although chrysanthemums have been cultivated for a long period, yet the rust has only recently attacked them, and almost at once has arisen to the proportions of an epidemic.

The rust is easily distinguished from all other diseases that attack the chrysanthemum. It forms small blisters, about the size of a pin head, or by coalescing much larger ones, which appear on the under surface of the leaf, and to some extent on the upper surface. These soon break open and expose a dark brown powder, the uredospores. On badly infested plants the leaves are well covered, especially beneath, with the loose brown powder, indicating the wonderful possibilities in spreading the infection to healthy plants in the vicinity, as every grain of this powder is capable of starting the fungus in a growing leaf, if the conditions are favorable.

The rust appeared on chrysanthemums in the vicinity of the Indiana Station in the fall of 1899, which was the first instance of its occurrence in this State, so far as I know. It seems to have been observed for the first time in America at Fitchburg, Mass., in the fall of 1896, doing great damage to the winter stock of George H. Hastings¹, and appeared in many widely separated localities in the eastern States by the fall of 1898. In England it appears to have been seen in 1895, becoming prevalent by 1897, while on the continent it put in an appearance a year or two later. It is now found in France, Germany, Denmark, America and probably other countries where the flower is much grown. A common feature of the advent of the rust in both Europe and America has been the virulence shown during the first season or two, and the consequent injury done to the crop.

¹ Stone and Smith, A Chrysanthemum Rust, 9th report, Hatch Exper. Sta. for 1896, pp 176-179. 1897.

² Gardener's Chronicle, 24:314. 1898.

³ Zeitschr. f. Pflanzenkr., 10:233. 1900.

The experimental study by the department began in November, 1899, and extended into the summer of 1900. The obvious and most pressing question was to ascertain if any truth lay in the assumption that has been brought forward that the rust is identical with that of certain common weeds, from which the infection might be derived. Until this point was settled, no plan for controlling or suppressing the disease could be advocated with confidence. The cultures were directed toward this end, and were made in the greenhouse upon vigorous plants that had been grown in pots for some time. They were as follows:

November 25—Uredospores from chrysanthemum sown on chrysanthemum; December 6, uredospores.

November 25—Uredospores from chrysanthemum sown on dandelion; no infection.

November 25—Uredospores from chrysanthemum sown on burdock; no infection.

December 11—Uredospores from dandelion sown on dandelion; date of uredospores not observed.

December 11—Uredospores from dandelion sown on chrysanthemum; no infection.

June 15—Uredospores from chrysanthemum sown on ox-eye daisy; no infection.

June 25—Uredospores from chrysanthemum sown on ox-eye daisy; no infection.

June 25—Uredospores from chrysanthemum sown on chrysanthemum; July 16 or before, uredospores.

July 21—Uredospores from chrysanthemum sown on chrysanthemum; August 11 or before, uredospores.

July 21—Uredospores from chrysanthemum sown on ox-eye daisy; no infection.

The cultures in July were conducted by the writer, and the others by the Assistant Botanist, Mr. William Stuart. The results of the work show with abundant clearness that while the rust is readily transferred from one chrysanthemum (*Chrysanthemum Indicum*) to another, it can not be transferred to dandelion, burdock, or the ox-eye daisy. They also show, although not in so pronounced a manner as could be desired, that the exceedingly common rust of the dandelion, occurring over the whole country throughout the active season, will not grow upon the chrysanthemum. In short it is pretty evident that we have to deal here with a rust which is not identical with one that is indigenous, although close resemblance in microscopic characters has led to that belief.

These conclusions were reached some time ago and confirmation has recently come in an account of cultures⁴ made abroad during the same period of time as our own. In Germany, Dr. Jacky, of Proskau, found

⁴*Zeitschr. f. Pflanzenkr.*, 10:136. 1900.

that the rust of the chrysanthemum could not be transferred to the marguerite, ox-eye daisy, tansy, costmary, or wild wormwood; and in England, Dr. Plowright found that it would not grow on dandelion, giant daisy, or orange hawkweed.⁶

There can, therefore, be no further question that the chrysanthemum rust is not the same as similar wild sorts, that it did not find its way into the greenhouse from other plants, either wild or cultivated, however closely related, and that it must in consequence have been inadvertently introduced, probably through commercial channels, from some region outside of Europe or America.

In seeking for the source of the rust it is natural to turn to Japan, the country oldest and most prominent in the cultivation of the chrysanthemum, and from which importations are still made to provide novelties for both the European and American markets.

In that country, as we learn in a communication from Professor Miyoshi, of Tokio, to Dr. Jacky, of Proskau, the rust "is indeed very common and well known." We further learn that it has so far passed under the name of *Puccinia Tanacetii* DC., and that the teleutospores also occur, as well as the uredospores. Japanese material has been examined by Dr. Jacky and found to be identical in the appearance of the uredoform with the European material. The conclusions seem to be beyond reasonable doubt that this disease has been brought from Japan and distributed by dealers in cuttings and rooted plants, and that for some unknown reason only the least to be dreaded of the two forms of spores produced by the fungus in its native country is rarely if ever developed in the western world.

It should be stated in this connection that teleutospores are mentioned and figured by Masse⁶ in his description of the fungus, and are described and figured by Roze⁷ in the account where he concludes (without making cultures) that the fungus is distinct from native sorts on composite plants, giving it the name *Puccinia Chrysanthemi*. It seems highly probable from circumstantial evidence that genuine teleutospores of the true rust were not seen by either observer, especially as the two differ in their accounts, neither are verified by other observers, and both fail to agree

⁶ The following is the list of plants on which the chrysanthemum rust has been tried, but with no infection:

Marguerite (*Chrysanthemum frutescens*).
 Ox-eye daisy (*Chrysanthemum Leucanthemum*).
 Giant daisy (*Chrysanthemum uliginosum*).
 Dandelion (*Taraxacum officinale*).
 Wild wormwood (*Artemisia campestris*).
 Orange hawkweed (*Hieracium aurantiacum*).
 Burdock (*Lappa major*).
 Costmary (*Tanacetum balsamita*).
 Tansy (*Tanacetum vulgare*).

⁶ Gard. Chron., 24:269. 1896.

⁷ Bulletin Soc. Myc. de France, 17:88. 1900.

with observations made upon the teleutospores transmitted from Japan. Moreover, it may be easily explained how the errors were unwittingly committed.

Having disposed of the question of the identity of the rust and feeling reasonably certain that we have to deal with a parasitic fungus, incapable of growth upon any wild or ordinarily cultivated plant of the country beside the chrysanthemum, it will be well to ascertain, so far as possible, in what manner it maintains itself from one favorable period of growth to another. It is quite certain that the mycelium of the fungus does not spread far through the tissues of the plant, and probably never enters the stems, certainly not the older stems. The disease is propagated from one leaf to another on the same or different plants by the spores, which are blown about by currents of air or carried by streams of water. We have to deal with but one kind of spore, which is fortunately shortlived; just how shortlived is not known, no observations apparently having been made. It is probably a safe assumption that the spores will not grow after a week or fortnight at the most, after dropping away from the leaf. Therefore, spores scattered about the greenhouse are likely to come to naught, if they do not speedily find living chrysanthemum leaves on which to vegetate. Outside of the greenhouse, it must be rare, if ever, that the rust lives over winter. One instance is reported from Germany, where shoots affected with the rust were exposed to outside weather from December 1 to the first week in February, the temperature at times dropping as low as thirteen degrees below zero (Fahrenheit). Spores subsequently taken from the dead leaves proved capable of growth. This must, however, be rated for the present as an exceptional instance, for all other observations go to show that the spores are not especially longlived or resistant.

Another circumstance much in the cultivator's favor is the propagation of the disease without the formation of customary teleutospores, or third stage. Not only does this render the disease far less persistent, but without doubt indicates that it is less vigorous in its attacks. In general, when a rust is confined to the uredoform for a number of generations, its vitality is much reduced, and also its power of injuring a crop. So long as the teleutospores do not make an appearance in this country, the careful cultivator may feel assured that a moderate amount of timely effort will enable him to rid his establishment of the rust, if he is so unfortunate as to have it donated to him by some careless florist. Observations made by the writer and others show that the tendency is for the disease to disappear of itself, to run its course in an establishment and die out, which is very likely to some extent due to the absence of teleutospores. Nothing has been said about aecidiospores, or first stage of the fungus, a still more reinvigorating form than the third stage, for it has not yet been learned from Japan whether the fungus possesses this form or not.

Having carefully reviewed the present knowledge of the characters and habits of the fungus, only a few words will be required to outline the treatment for its suppression or control. Care should be taken that the rust does not invade an establishment. All purchased cuttings or plants should be carefully looked over for the rust, and also closely watched for at least a month afterward to detect the very beginning of the disease, should it develop. If taken in time, removing the diseased leaves as they appear, and burning them without scattering the spore powder, is likely to stop its spread. Other precautions which will occur to any cultivator, like wholly destroying very badly infested plants, may also be employed. Should it continue to crop out in spite of all such attention, every leaf and stem above ground should be destroyed at the end of the flowering period, and the young plants or cuttings for the next season's supply be grown in an uncontaminated house and if possible from uncontaminated material. With an understanding of the nature of the rust fungus there will probably be little difficulty in fully eradicating the disease by the end of the second season at the longest.

Spraying with a suitable fungicide to keep the rust in check has been recommended by a number of writers. How efficient this method will prove can not be definitely stated, as experimental reports are lacking and the Station has not had an opportunity to make tests. The Bordeaux mixture may be used, or sulfide of potassium. For the latter, use one ounce to two gallons of water, and apply weekly. No fungicide is likely to stop the disease without hand picking, but if rightly used will undoubtedly prove a material assistance.

SUMMARY.

1. The chrysanthemum rust has invaded America within a half decade, and in various places, including Indiana, has done injury to the chrysanthemum industry.

2. The rust will grow only upon the true chrysanthemum (*Chrysanthemum Indicum*), and not upon daisies, costmary or other allied species, or upon more distantly related plants.

3. The Latin name of the rust is *Puccinia Chrysanthemi*, given to it recently by Roze.

4. It appears to be a native of Japan, and has been introduced into Europe and America through commercial agencies.

5. In the western world the fungus produces only uredospores, which are efficient for spreading the disease under favorable conditions, but not for carrying it through uncongenial periods, or for maintaining the fungus in full vigor.

6. So long as teleutospores do not appear, the disease is likely to be easy of control, and at present none have been found outside of the orient.

7. Care to keep out the disease, and handpicking with total destruction of badly diseased plants when it does appear, should be effective in wholly evading the disease or in eradicating it within a year or two.

8. Spraying all plants of a house frequently with Bordeaux mixture or sulfide of potassium will doubtless assist in keeping the disease in check.

Bulletin No. 86, December, 1900.

ON THE AMOUNT OF WATER IN SLOP FED FATTENING PIGS.

C. S. PLUMB AND H. E. VAN NORMAN.

From time to time the question has been asked by visitors to the Indiana experiment station, "How thin or how thick should the slop for pigs be made?" This same subject has been discussed to some extent in feeders' meetings, as well as in conversation among pig feeders. So far as the writers are aware, however, there is no information on this subject in printed form, whereby one may cite the results of investigation. Many persons think that ground feed should be moistened just enough to pour it well from the pail to trough, yet not be very watery, while others desire the slop to be quite liquid. No one, however, seems to have thus far published any facts of importance in this interesting field.

With a view of studying this subject, the following experiment was begun at this station on January 24, 1900, and continued till June 19, a period of 146 days.

The animals used were sixteen in number, consisting of eight pure-bred Chester Whites and eight Berkshires. These were divided into four lots of four each, with two of each breed in each lot. One Chester White in each lot was farrowed on September 14, and one on September 21, while all the Berkshires were farrowed October 17. Lots I and IV each contained a barrow, while Lots II and III each contained two barrows, there being one of each breed. The males are numbers 278, 286, 298, 289, 292 and 285.

The foods used were a mixture of equal parts of pure corn meal and shorts till the period beginning May 9, after which hominy feed took the place of the corn meal, and they were fed under these conditions:

Lot I was fed the food dry in the trough.

Lot II was fed the grain mixed with its weight of water.

Lot III was fed the grain mixed with twice its weight of water.

Lot IV was fed the grain mixed with three times its weight of water.

Each lot of pigs was given all the water desired additional to that mixed with the grain, and a record was kept of the amount of water drunk daily. The pigs also had access to ashes and salt.

The pigs were fed about 7:00 a. m. and 5:30 p. m., and were weighed once a week, about 11:00 in the morning. Mr. Van Norman supervised all feeding and weighing. As a matter of convenience the feeding periods are in seven-day groups.

The pigs were fed in pens 7x8 feet in size, and occupied separate quarters for sleeping rooms. The animals were generally in first-class health during the experiment.

POUNDS FOODS FED PER PERIOD TO PIGS LOTS A, B, C, D.

1900.	Lot A, Dry Feed.		Lot B, 1 Part Grain, 1 Water.		Lot C, 1 Part Grain, 2 Water.		Lot D, 1 Part Grain, 3 Water.	
	Cornmeal.	Shorts.	Cornmeal.	Shorts.	Cornmeal.	Shorts.	Cornmeal.	Shorts.
January 24-31	29	29	33.75	33.75	29.75	29.75	27	27
January 31 to February 7	19	19	34.5	34.5	31.5	31.5	23.5	23.5
February 7-14	31	31	39	39	39	39	36.25	36.25
February 14-21	36	36	42.5	42.5	42.5	42.5	38.5	38.5
February 21-28	42	40.5	42	42	42	42	42	42
February 28 to March 7	40.5	42	42	42	42	42	42	42
March 7-14	42	42	42	42	42	42	42	42
March 14-21	42	42	42	42	42	42	42	42
March 21-28	48	48	48	48	48	48	48	48
March 28 to April 4	49	49	49	49	49	49	49	49
April 4-11	49	49	49	49	49	49	49	49
April 11-18	49	49	49	49	49	49	49	49
April 18-25	56	56	56	56	56	56	56	56
April 25 to May 2	63	63	63	63	63	63	63	63
May 2-9	63.5	63.5	66.5	66.5	66.5	66.5	67	67
May 9-16	Hominy.		Hominy.		Hominy.		Hominy.	
May 16-23	70	70	70	70	70	70	70	70
May 23-30	77	77	77	77	77	77	77	77
May 30-June 6	84	84	84	84	84	84	84	84
June 6-13	84	84	98	98	98	98	84	84
June 13-20	84	84	98	98	98	98	84	84
Total	1141	1141	1225.25	1225.25	1218.25	1218.25	1151.25	1151.25

The number of each pig, sex, breed and weight in each lot on January 24 is herewith given.

Lot I.

No. 278. Male, Chester White, weight.....	86.5 lbs.
No. 287. Female, Chester White, weight.....	56.0 lbs.
No. 295. Female, Berkshire, weight.....	43.0 lbs.
No. 297. Female, Berkshire, weight.....	55.0 lbs.
Total	240.5 lbs.

Lot II.

No. 283. Female, Chester White, weight.....	71.5 lbs.
No. 286. Male, Chester White, weight.....	63.0 lbs.
No. 290. Female, Berkshire, weight.....	61.0 lbs.
No. 298. Male, Berkshire, weight.....	42.0 lbs.
Total	237.5 lbs.

Lot III.

No. 282. Female, Chester White, weight.....	75.0 lbs.
No. 289. Male, Chester White, weight.....	57.5 lbs.
No. 292. Male, Berkshire, weight.....	54.5 lbs.
No. 296. Female, Berkshire, weight.....	51.5 lbs.
Total	238.5 lbs.

Lot IV.

No. 280. Female, Chester White, weight.....	76.0 lbs.
No. 285. Male, Chester White, weight.....	52.0 lbs.
No. 291. Female, Berkshire, weight.....	40.0 lbs.
No. 294. Female, Berkshire, weight.....	70.0 lbs.
Total	238.0 lbs.

An examination of these figures shows no important difference in the results secured. They show, however, that

Lot A gained 634 pounds in 146 days, or $4\frac{1}{2}$ pounds per day.
 Lot B gained 644½ pounds in 146 days, or $4\frac{1}{2}$ pounds per day.
 Lot C gained 650½ pounds in 146 days, or $4\frac{1}{2}$ pounds per day.
 Lot D gained 614 pounds in 146 days, or $4\frac{1}{2}$ pounds per day.

These figures also show that each of the four pigs gained slightly over a pound in weight per day during the experiment.

As is to be expected, the poorest gains were made in severely cold weather, and the best in the latter part of the experiment, when the temperature was mild and comfortable. In May some of the pigs averaged a gain of over two pounds daily, and grew very rapidly.

The amount of food consumed in relation to gain in weight is an important matter, as is also the amount of water drunk. The table on page 645 shows how much grain was fed each lot.

From this it will be seen that

- Lot A ate 2,282 pounds corn meal and shorts or hominy, half and half.
- Lot B ate 2,450½ pounds corn meal and shorts or hominy, half and half.
- Lot C ate 2,436½ pounds corn meal and shorts or hominy, half and half.
- Lot D ate 2,302½ pounds corn meal and shorts or hominy, half and half.

If these figures be compared with the gains in live weight, it will be seen that

To make one pound of gain Lot A ate 3.59 pounds of grain.

To make one pound of gain Lot B ate 3.80 pounds of grain.

To make one pound of gain Lot C ate 3.74 pounds of grain.

To make one pound of gain Lot D ate 3.75 pounds of grain.

The tables on pages 649 and 650 give the weekly weights of each pig, the average weight of the pigs in each lot and the total weight per lot.

TOTAL POUNDS OF WATER GIVEN PER LOT PER PERIOD, AND AVERAGE AMOUNT PER PIG PER DAY.

Period.	Lot A.		Lot B.		Lot C.		Lot D.	
	Total per Period.	Daily Average per Head.	Total per Period.	Daily Average per Head.	Total per Period.	Daily Average per Head.	Total per Period.	Daily Average per Head.
January 24 to 31	66	2.35	68	2.42	119.25	4.25	182.37	5.79
January 31 to February 7	67	2.39	68	2.42	126	4.50	177	6.32
February 7 to February 14	70	2.50	77	2.75	155	5.53	217.50	7.76
February 14 to February 21	70	2.50	92	3.27	169	6.03	231	8.25
February 21 to February 28	84	3	100	3.57	168	6	232	9
February 28 to March 7	84	3	94	3.35	168	6	232	9
March 7 to March 14	84	2.42	84	3.35	168	6	232	9
March 14 to March 21	84	3	92	3.27	168	6	232	9
March 21 to March 28	118	4.21	102	3.64	192	6.85	288	10.28
March 28 to April 4	106	3.78	126	4.50	196	7	294	10.50
April 4 to April 11	135	4.82	146	5.21	196	7	294	10.50
April 11 to April 18	140	5	152	4.71	196	7	294	10.50
April 18 to April 25	155	5.53	157	5.60	224	8	328	12
April 25 to May 2	210	7.50	157	5.60	224	8	328	12
May 2 to May 9	165	6.96	172	6.14	274	9.78	378	13.50
May 9 to May 16	253	9.03	184	6.57	290	10	422	15.07
May 16 to May 23	320	11.42	210	7.50	308	11	420	15
May 23 to May 30	295	10.53	229	8.17	336	12	462	16.50
May 30 to June 6	264.5	9.44	235	8.39	322	12	432	15.42
June 6 to June 13	280	10	238	8.50	392	14	504	18
June 13 to June 20	310	11.07	229	8.17	392	14	504	18
Total	3,374.5		3,031		4,871.25		6,927.87	

WEIGHTS OF PIGS IN POUNDS.

Lot A. Grain Fed Dry.					Lot B. One Part Grain, One Part Water.							
No. 278.	No. 287.	No. 287.	No. 286.	Total Weekly Weight.	Average Weight.	Dates, 1900.	No. 283.	No. 286.	No. 286.	No. 286.	Total Weekly Weight.	Average Weight.
86.5	56	55	43	240.5	60.1	..... January 24	71.5	63	61	42	237.5	59.3
89	58	55	44	240	61.5	..... January 31	73.5	63	61	41.5	244	61
86.5	60.5	57.5	45	248.5	62.1	..... February 7	83	69	64.5	46	262.5	65.6
88	62	62	48	265	68.2	..... February 14	91	79	73	46.5	285.5	71.3
91	74	66	50	281	70.2	..... February 21	98	85	85.5	49	301	75.2
98	81	73	56	308	77	..... February 28	101.5	90.5	90.5	54	326.5	81.5
101.5	87.5	81	59	329	82.2	..... March 7	107.5	95	90.5	56	346.5	86.6
105	93	85	62	345	86.2	..... March 14	111	96	96	60	361.5	91.1
108	100	90	65	363	90.7	..... March 21	117	100	106	65	388	97
115	112.5	101	70	398.5	99.6	..... March 28	128	109	114	69	420	105
126	128	112	75	418.5	104.6	..... April 4	136	113	123	75	447	111.7
130	135	120	79	445	111.2	..... April 11	142	121	131	81	475	118.7
139	143	129	84.5	469.5	117.2	..... April 18	150	125	138	86	498	124.5
149	154	140	90	501	125.2	..... April 25	157	131.5	147	90	525.5	131.3
159	163	150	98	541	135.2	..... May 2	161	140	160	96	557	139.2
171	175	164	102.5	574.5	144.6	..... May 9	169	150	171	105	595	146.7
184	192	176	115	625	158.2	..... May 16	179	161	183	113	636	159
193	208	196	124.5	679.5	169.6	..... May 23	189.5	171	199	127	686.5	171.6
205	218	213	135.5	732.5	183.1	..... May 30	202	183	210	140	735	183.7
222	229	221	146	782	195.1	..... June 6	216	202	229	155	804	201
230	242	234	158	830	207.5	..... June 13	227	221	240	171	859	214.7
			168	874	216.5	..... June 20	233	223	247	179	882	220.5
143.5	186	179	125	683.5	158.5	..... Total gain	161.5	160	186	137	644.5	161.2

WEIGHTS OF PIGS IN POUNDS.

Lot C. One Part Grain, Two Parts Water.						Lot D. One Part Grain, Three Parts Water.						
No. 282.	No. 289.	No. 292.	No. 296.	Total Weekly Weight.	Average Weekly Weight.	Date, 1900.	No. 280.	No. 286.	No. 291.	No. 294.	Total Weekly Weight.	Average Weekly Weight.
75	57.5	54.5	51.5	238.5	59.6	January 24	76	52	40	70	238	59.5
82	67	55	50.5	217.5	61.8	January 31	77	56	38.5	72.5	244	61
88	74	58	55	263	65.7	February 7	80	61	41	75	254	63.5
90	78	62	62	286	71.5	February 14	90	61	45	83	289	72.2
95	85	67	65	300	75	February 21	93	66	46	88	293	73.2
97	90	73.5	71.5	325	81.2	February 28	102	71	52	97	322	80.5
100.5	96.5	77	73	337	84.2	March 7	104	76	54.5	100	336.5	84.1
102.5	102.5	84	83.5	359	89.7	March 14	112	84	60	107.5	360	90
110	114	89.5	83.5	378	94.5	March 21	115	84	66	113	372	98
114	121	100	92	416	104	March 28	122	93	66	125	405	101.2
117.5	129	106	98	439	109.7	April 4	132	99	71	132	434	108.5
121	131	112	104	462.5	115.6	April 11	137.5	106	74.5	139	456	114
126	140	117	109	478	119.5	April 18	142	110	79	145	476	119
133	151	124	116	506	126.5	April 25	153	119	83	156.5	511.5	127.8
141	160	134	127.5	545.5	136.3	May 2	158	127.5	93	168	546.5	136.6
149	172	144	135	590	145	May 9	170	133	98	180	581	145.2
155	187	157	146	624	156	May 16	182.5	144	110	189	625	156.2
164	200	171.5	163	676.5	169.1	May 23	189	157	122	206	674	169.5
176	215	185	177	726	181.5	May 30	192	161	131	214	698	174.5
186.5	234	204	206	785	194.2	June 6	206	177	145	234	762	190.5
195	249	218	206	844.5	211.1	June 13	218	185	158	254	815	205.7
		229	216	869	222.2	June 20	225	195	170	262	852	213
120	191.5	174.5	161.5	650.5	162.6	Total gain	149	143	130	192	614	153.5

As the cost of the food fed averaged about 80 cents per hundred pounds,

The cost per pound of gain was 2.87 cents in Lot A.

The cost per pound of gain was 3.04 cents in Lot B.

The cost per pound of gain was 2.99 cents in Lot C.

The cost per pound of gain was 3.00 cents in Lot D.

The amount of water given the different lots is especially worthy of notice. No water was given with the grain in Lot A, but such water as might be desired was weighed out and turned in the trough after the grain was eaten up clean. Neither did Lot B receive sufficient water with its grain to meet natural demands, so that extra water was weighed to the pigs in this lot, while Lots C and D required no more water than that in the grain. The table on page 648 is of special interest, as showing something of the amount of water consumed by a pig per day. Perhaps some of the pigs may have drunk some rain water standing in the lots during the course of the experiment, but of that it is impossible to have any record.

The table shows that Lot A was fed more water than Lot B by $343\frac{1}{4}$ pounds, and that Lot C was given $4,871\frac{1}{4}$ pounds, and Lot D $6,927\frac{7}{8}$ pounds. The figures also bring out the fact that pigs weighing 60 pounds fed dry feed, consumed on an average 2.35 pounds water daily, and that this amount increased nearly constantly until these same pigs weighing 218 pounds consumed 11.07 pounds per day. It is also shown that pigs fed water in their food as a slop, when weighing about 60 pounds, consumed either 2.42, 4.25 or 5.79 pounds of water per day, while these same pigs weighing 213 to 222 pounds consumed either 8.17, 14 or 18 pounds of water per day. Undoubtedly much of this water was consumed unnecessarily, and certainly Lot D was given much more water with its grain than was required.

There was no material difference in the appearance of the pigs in either lot, so far as quality is concerned, and so far as this one experiment goes, the use of about two times the weight of water to grain indicates a satisfactory proportion. In view of the fact that the pigs fed dry grain made slightly the best gains, it would appear that there is really no gain in feeding the pigs a slop instead of a dry grain, excepting as a feeder may regard it a matter of convenience.

REPORT
ON
FARMERS' INSTITUTES

UNDER THE AUSPICES OF

PURDUE UNIVERSITY SCHOOL OF
AGRICULTURE

FOR THE

Year Ending March 31, 1901.

SUPERINTENDENT'S REPORT.

FARMERS' INSTITUTES.

REPORT OF SUPERINTENDENT.

Introductory.—Although the fiscal year begins November 1, the working year of farmers' institutes has for some years began the 1st of April. At this time the officers, who have been elected at the annual meetings held during the previous winter, assume control of the work in their respective counties for the ensuing year. The work of the year just closed began with the formal appointment of the county chairmen to hold institutes in their respective counties for the year ending March 31, 1901. At the same time a circular letter was sent out to all the chairmen-elect asking for an expression of the views of those specially interested as to the speakers and subjects preferred for the next institute, time and place of meeting, etc. Each chairman was thus given opportunity to express the desires of the people of his locality relative to institute work. Replies from all the chairmen were received and carefully filed for reference in making up the schedule of meetings later.

In April a brief report of the work was prepared by the superintendent and sent with accompanying papers of local institute workers to the Secretary of the State Board of Agriculture for publication in the Annual Report of that body. Early in the year, also, circular letters were sent out to the prospective institute workers throughout the State. These letters were addressed to those who had done institute work in previous years, and to others who had been recommended for such work by the county chairmen, county secretaries or assigned speakers. A list of speakers, with subjects, was published early in the season and sent out to the chairmen as a further aid to them in the selection of speakers and subjects for the coming institute season.

In July and August the Superintendent visited, as has been his custom, midsummer institutes in various counties of the State. About the middle of the summer preparations were begun for the third annual conference of institute officers and workers which was held, as heretofore, in October.

The time intervening between this conference and the opening of the institute season was fully occupied with correspondence and preparation for the active season which began November 28, 1900, and ended March 23, 1901.

This introductory statement is made to show all who may be interested that the work of the Superintendent does not begin and end with the active institute season, but continues uninterruptedly throughout the year, indeed the large proportion of the correspondence is conducted between the institute seasons.

INSTITUTE CONFERENCE OF 1900.

The Third Annual Conference of the Institute Officers and Workers was held at Purdue University October 17-18, 1900. Fifty-one counties were represented by 115 registered delegates at the first conference, held in October, 1898. At the second conference, held in October, 1899, sixty-three counties were represented by 166 registered delegates. At the third and last annual conference 147 delegates were present, representing fifty-three counties. The slight falling off in attendance at the third, as compared with the second conference, is fully accounted for in the fact that 1900 was "campaign year," and because many of the farmers had delayed sowing their wheat to avoid the ravages of the Hessian fly, which had been prevalent the two years previous. The meeting of last October surpassed its predecessors in interest and in harmony of proceedings. The attendance was largely made up of active farmers, who are identified with the institute work in their respective localities as officers or speakers. Several farmers' wives accompanied their husbands to the conference, thus adding materially by their presence and influence to the interest of the occasion. It is due to the delegates who have attended these several conferences to say that, without exception, they have done so without compensation, and with few exceptions, have borne their own traveling expenses as well. In a few instances county chairmen have been reimbursed in part by the local associations which they have represented. Those within the State who have been assigned duty on the program have from year to year served without compensation. In addition to this, these workers also bore a portion of their expenses on account of the conference of last October. Such generous co-operation on the part of the institute officers and workers is a most favorable omen for the future of the institute work in Indiana. The program of the conference was as follows:

PROGRAM.

Wednesday, 10 a. m., N. P. Hines, Boonville, Presiding.

Prayer—Rev. J. P. Hale, Pastor Second Presbyterian Church.

Welcome—President W. E. Stone.

The Soil:

Its Physical Improvement—Cal Husselman, Auburn.

Its Fertilization—Prof. H. A. Huston.

Its Cropping—E. C. Mercer, Rochester.

General Discussion—Announcements.

Wednesday, 1:30 p. m., B. F. Gaston, Sardinia, Presiding.

Sheep and Cattle:

Winter Feeding of Sheep—A. M. Welch, Ionia, Mich.

Beef Production—L. H. Kerrick, Bloomington, Ill.

Questions and General Discussion.

4:00 p. m.—Informal conference in charge of Mrs. J. C. Erwin, Bourbon.

Suggested Topics: Woman's sessions; Reducing home work; Increasing home cheer; What Farmers' Institutes may do for the family, etc.

Wednesday, 7:30 p. m., Mrs. J. A. Walker, Huntington, Presiding.

The Farm Home:

The Dwelling—Mrs. J. A. Mount, Indianapolis.

The Surroundings—W. S. Ratliff, Richmond.

Home Making—Mrs. W. F. De Vilbiss, Ft. Wayne.

General Discussion, led by Mrs. Ruth Hunt Stuart, West Lafayette.

Thursday, 9 a. m., T. J. Lindley, Noblesville, Presiding.

Prayer—Rev. D. R. Landis, Pastor First Baptist Church.

Informal Conference in charge of J. J. W. Billingsley, Indianapolis.

Suggested Topics: Getting Workers; Making program; Advertising; Ends and Methods, etc.

The Needs of Agriculture: (10 o'clock).

Specialization—U. M. Stewart, Madison.

Co-operation—Prof. C. S. Plumb.

Fraternalization—Aaron Jones, South Bend.

Education—President W. E. Stone.

Thursday, 1:30 p. m., G. M. Naber, Treaty, Presiding.

The Needs of the Institute Work, as seen by—

A Chairman—Alex. Johnson, Ft. Wayne.

A Worker—H. F. McMahan, Fairfield.

The Superintendent—Prof. W. C. Latta.

3:30 p. m.—Farmers' Institute Round Table:

A general informal discussion by the audience of the ways and means of promoting the institute work. The questions and suggestions of officers and workers, as to the details of the work, will be in order at this time.

With a single exception the program was rendered as given above. Mr. Aaron Jones, of South Bend, was unable to be present on account of a severe cold. The papers and addresses were carefully prepared and well received. Especial interest was manifested in the "Fertilization of the Soil," "The Farm Home," and "Agricultural Education." President Stone's address dwelt at considerable length on the difficult problem of agricultural education, set forth clearly the good work of the School of Agriculture, considering its limited facilities, and presented an earnest plea in behalf of more ample provision on the part of the State for the building up of this school. The address was listened to with the closest attention and with manifestations of earnest approval on the part of the audience.

The committee on resolutions, consisting of H. F. McMahan, of Fairfield; Mrs. Naomi De Vilbiss, of Ft. Wayne; G. M. Naber, of Treaty; J. J. W. Billingsley, of Indianapolis, and Milton Trusler, of Connersville, was appointed at the opening session. At the closing session, this committee, through its chairman, Mr. McMahan, presented its report, signed by all of the committee excepting Mr. Trusler, who was unable to be present. The resolutions as presented by the committee and adopted by the conference were as follows:

RESOLUTIONS.

We, the workers, officers and friends of the farmers' institutes of the State of Indiana, assembled at Purdue University in conference resolve:

1. That we thank the President and Faculty of Purdue University for their hospitality on this occasion, and for their untiring efforts in behalf of education for the farmers and their families of the State of Indiana.
2. Whereas, we appreciate the value of the institute work already being done, acknowledge its success considering the limited appropriation, and, feeling the need of largely extending the work, therefore we pledge

ourselves as a body, and as individuals, to do all we can to arouse public sentiment in favor of a largely increased appropriation, and that we will instruct our State Representatives to this end.

3. That a committee of three be appointed by the general committee on Institutes, whose duty shall be to assist in securing an increased appropriation for farmers' institutes.

4. That we commend the excellent work of the Agricultural College of Purdue, that we appreciate the urgent need of buildings and equipment to accommodate the rapidly increasing class of agricultural students and to keep pace with the growing importance of agriculture, and that we will send our boys and girls to Purdue University for an excellent training in agriculture.

COUNTIES REPRESENTED AND DELEGATES AT CONFERENCE.

Following is a list of the delegates attending the conference, as shown by their registry cards, filed with the Superintendent of Institutes. A considerable number of those attending from the vicinity of Lafayette did not register as delegates:

Allen County—Hon. Alexander Johnson, Chairman; Mrs. W. F. De Vilbiss, Secretary; O. C. Smith, all of Ft. Wayne.

Bartholomew County—Mrs. Charles R. Haymond, Hope.

Benton County—John A. Roth, Secretary, Fowler.

Boone County—R. J. Riner, Advance.

Carroll County—Noah Fouts, Chairman, Deer Creek; Wm. H. Grinn, Delphi.

Cass County—John H. Rohrer, Chairman; Samuel H. Little, R. H. Barnett, Robert Reed and Florence E. Little, all of Logansport; Lora Wilson and Charles O. Mummert, both of Young America.

Clinton County—D. F. Maish, Chairman, and wife, Frankfort; A. W. Peter, Secretary, and wife, Mulberry.

Dearborn County—H. L. Nowlin, Secretary, Gullford; J. C. Small, Aurora.

Decatur County—B. F. Gaston, Chairman; Carl Gaston, both of Sardinia; S. L. Jackson, Frank Kitchen and wife, all of Greensburg.

Dekalb County—J. E. Dilgard, Secretary; S. A. Dilgard, both of Waterloo; Cal Husselman, Auburn.

Delaware County—Mrs. John M. Bloss, Muncie; D. I. Duncan, Selma.

Dubois County—S. H. Stewart and Beulah Stewart, both of Ireland.

Fayette County—J. B. Jones and daughter, Lyons Station; John J. Schoenholtz, Connersville.

Floyd County—H. B. Stoy, Duncan; Joseph Stilger, Edwardsville.

Fountain County—Wm. Kreusch, Covington.

Fulton County—E. C. Mercer, Chairman, Rochester.

Grant County—J. M. Ballard, Chairman, Marlon.

- Hamilton County—T. J. Lindley, Chairman; A. A. Landley, both of Noblesville; E. H. Collins, Carmel.
- Hendricks County—E. B. Davis, Chairman, Cartersburg; Fred B. Soper, Secretary, Danville; Wm. N. Parsons, Plainfield; T. J. Christie, Hadley.
- Howard County—L. C. Hoss, Kokomo.
- Huntington County—I. M. Strouse, Secretary; Ben. F. Billiter, Mrs. Oliver Kline, Mrs. J. A. Walker, all of Huntington; S. W. Rarick and wife, Markle; Ed. Whitmore and J. W. Brown, both of Mt. Etna; S. M. Shultz, Bracken.
- Jackson County—D. M. Lett, Crothersville; Mrs. Oscar E. Carter, Seymour.
- Jefferson County—U. M. Stewart, Chairman, Madison; D. W. Scott, Sugan.
- Jennings County—O. F. Phillips, Secretary, Butlerville.
- Laporte County—W. A. Banks, Chairman; W. Scott Wall, Secretary; Mrs. O. Wall, Mrs. Archie Orr, all of Laporte.
- Marion County—J. J. W. Billingsley, Indianapolis; Mrs. J. W. Bates, Broad Ripple.
- Marshall County—E. S. Freese, Chairman, Twin Lakes; William Erwin and wife, Bourbon.
- Monroe County—W. H. H. Parks, Chairman, Bloomington.
- Montgomery County—J. M. Harshbarger, Chairman, Ladoga.
- Newton County—E. A. Lewis, Morocco.
- Ohio County—E. T. Winn, Chairman, and wife, Rising Sun.
- Parke County—H. C. Vestal, Montezuma; J. C. Swain and E. D. Litsey, both of Marshall.
- Porter County—A. B. Lantz, Chairman, Hurlburt.
- Pulaski County—Isaac L. Washburn, Chairman; Mary E. Washburn, both of Star City.
- Putnam County—L. A. Stockwell, Chairman, Cloverdale.
- Randolph County—Andrew H. Moore and Emaline Moore, Farmland.
- Scott County—John W. Cooperider, Scottsburg.
- Shelby County—A. W. Tindall, Chairman, and wife, Shelbyville.
- Spencer County—Mrs. George Thomas, Secretary, Rockport; W. B. Richardson, Eureka.
- Tippecanoe County—J. E. Marshall, Chairman, and wife, Montmorenci; Grant Holwerda, G. W. Switzer, O. C. Allen and wife, Q. A. Earl, Frank Acheson and wife, Mrs. Ruth Hunt Stewart, J. M. Boggs, Chas. Welch, all of Lafayette; Henry Leaming and wife, Romney; G. C. Leaming and wife, W. H. Skinner, Warner Throckmorton, all of Romney; J. H. Miller and wife, Pettit; G. L. Marshall, Surface; Timothy Driscoll, Conroe; J. Stanfield, Albert Stair, both of Buck Creek; C. J. Whistler and wife, Heath; J. B. Lutz, J. H. Bone and wife, Shadeland; J. B. Jones, Stockwell; M. W. Earl and wife, Mrs. Thos. Earl, all of Wea.
- Tipton County—Frank McLaughlin, Tipton.
- Union County—H. F. McMahan, Secretary, and wife, Fairfield.

Vanderburgh County—W. C. Goldsmith, Chairman, Evansville.
 Vigo County—John Royse, Terre Haute.
 Warren County—T. J. Farden, Chairman, West Lebanon; S. A. Sailor and wife, Williamsport.
 Warrick County—N. P. Hines, Chairman, Boonville.
 Wayne County—Thomas O. Henby and wife, Dublin; Walter S. Ratliff, Richmond.
 White County—E. W. Hoch, Chairman, Joseph T. Moore, Secretary, both of Buffalo; T. F. Chambers, Smithson; N. W. Sharpe, Gertrude Barnes, both of Idaville.
 Whitley County—David Miller, Albert Busch and wife, all of Columbia City.
 Ohio—T. J. Miller, Leipsic.
 Illinois—L. H. Kerrick, Bloomington.
 Michigan—A. M. Welch, Ionia.

Number of counties represented..... 53
 Number of registered delegates..... 147
 Number of States represented..... 3

SCHEDULE FARMERS' INSTITUTES FOR 1900-1901.

Each county of the State held an institute under State auspices the past season. The following is a schedule of the meetings held, showing time and place of meeting, chairmen and speakers assigned:

DECEMBER.

PLACE OF MEETING AND CHAIRMAN OF INSTITUTE	DATE.	ASSIGNED SPEAKERS.
Washington, Salem.....	Monday, Nov. 26.....	McMahan. Mrs. Erwin.
E. H. Wright, Salem.....	Tuesday, Nov. 27.....	
Floyd, Edwardsville.....	Wednesday, Nov. 28.....	
H. B. Stoy, Edwardsville.....	Thursday, Nov. 29.....	
Harrison, Corydon.....	Friday, Nov. 30.....	
J. S. Pfrimmer, Breckenridge.....	Saturday, Dec. 1.....	
Brown, Nashville.....	Tuesday, Nov. 27.....	Johnson, D. B. Mrs. Carter.
H. B. Miller, Nashville.....	Wednesday, Nov. 28.....	
Warrick, Boonville.....	Monday, Nov. 26.....	Husselman. Miss Clarke (T.).
N. P. Hines, Boonville.....	Tuesday, Nov. 27.....	
Spencer, Chrisney.....	Wednesday, Nov. 28.....	Husselman. Burton.
C. C. Dawson, Grandview.....	Thursday, Nov. 29.....	
Perry, Tobsport.....	Friday, Nov. 30.....	
J. J. Wheeler, Rome.....	Saturday, Dec. 1.....	
Dubois, Jasper.....	Monday, Nov. 26.....	Miss Clarke (M.). Anderson.
J. Gerkin, Huntingburg.....	Tuesday, Nov. 27.....	
Vanderburgh, McCutchanville.....	Wednesday, Nov. 28.....	Hines. Miss Clarke.
W. C. Goldsmith, Evansville.....	Thursday, Nov. 29.....	
Pike, Petersburg.....	Friday, Nov. 30.....	
J. D. Selby, Petersburg.....	Saturday, Dec. 1.....	

DECEMBER—Continued.

PLACE OF MEETING AND CHAIRMAN OF INSTITUTE.	DATE.	ASSIGNED SPEAKERS.
Ripley, Versailles..... T. G. Day, Correct	Friday, Nov. 30	Nowlin.
	Saturday, Dec. 1	Mrs. Carter.
Crawford, English	Monday, Dec. 3	Husselman.
W. S. Ross, Milltown	Tuesday, Dec. 4	Cooperider.
Clark, Charlestown	Wednesday, Dec. 5	Husselman. Prof. Troop.
J. M. Haymaker, Charlestown	Thursday, Dec. 6	
Scott, Scottsburg	Friday, Dec. 7	
T. J. Morgan, Austin	Saturday, Dec. 8	
Monroe, Bloomington	Monday, Dec. 3	McMahan. Miss Clarke.
W. H. H. Parks, Bloomington	Tuesday, Dec. 4	
Orange, Orleans	Wednesday, Dec. 5	
Uscar Hardman, Orleans	Thursday, Dec. 6	
Lawrence, Heltonville	Friday, Dec. 7	Miss Clarke (F.).
H. Henderson, Heltonville	Saturday, Dec. 8	McMahan.
Jennings, North Vernon	Wednesday, Dec. 5	Trusler.
P. B. Ewan, Hayden	Thursday, Dec. 6	Stockwell.
Dearborn, Ebenezer Church	Friday, Dec. 7	Trusler.
W. H. Curtis, Aurora	Saturday, Dec. 8	Miss Clarke (S.).
Ohio, Mt. Carmel Church	Monday, Dec. 3	Burton. Gwaltney.
E. T. Winn, Rising Sun	Tuesday, Dec. 4	
Switzerland, Vevay	Wednesday, Dec. 5	
G. W. Dorrell, Quercus Grove	Thursday, Dec. 6	
Jefferson, Lancaster	Friday, Dec. 7	
U. M. Stewart, Madison	Saturday, Dec. 8	
Sullivan, Sullivan	Monday, Dec. 3	Hines. Randel.
G. C. Youngman, New Lebanon	Tuesday, Dec. 4	
Martin, Shoals	Wednesday, Dec. 5	
J. M. Sherfick, Shoals	Thursday, Dec. 6	
Daviess, Washington	Friday, Dec. 7	
P. McHenry, Plainville	Saturday, Dec. 8	
Clay, Cory	Monday, Dec. 10	McMahan. Cooperider.
C. S. Maurer, Brazil	Tuesday, Dec. 11	
Greene, Lyons	Wednesday, Dec. 12	
Wm. Stacey, Lyons	Thursday, Dec. 13	
Owen, Spencer	Friday, Dec. 14	
W. H. Troth, Vandalia	Saturday, Dec. 15	
Parko, Rockville	Monday, Dec. 10	Miss Clarke (M.).
Chas. Davis, Rockville	Tuesday, Dec. 11	Prof. Troop.
Fountain, Covington	Wednesday, Dec. 12	Prof. Plumb.
A. P. Burnside, Covington	Thursday, Dec. 13	Miss Clarke (T.).
Warren, West Lebanon	Friday, Dec. 14	Miss Clarke (F.).
T. J. Farden, West Lebanon	Saturday, Dec. 15	Husselman.
Cass, Logansport	Monday, Dec. 10	Husselman.
J. H. Rohrer, Logansport	Tuesday, Dec. 11	Miss Clarke (T.).
Grant, Marion	Wednesday, Dec. 12	Miss Clarke (W.).
J. M. Ballard, Marion	Thursday, Dec. 13	Husselman.
Wabash, Wabash	Friday, Dec. 14	Prof. Huston.
G. M. Naber, Treaty	Saturday, Dec. 15	Miss Clarke (S.).
White, Buffalo	Monday, Dec. 17	Lane.
Edward Hoch, Buffalo	Tuesday, Dec. 18	Prof. Huston.

DECEMBER—Continued.

PLACE OF MEETING AND CHAIRMAN OF INSTITUTE.	DATE.	ASSIGNED SPEAKERS.
Newton, Morocco	Wednesday, Dec. 19	Lane. Somers.
Ed. Parsons, Morocco	Thursday, Dec. 20	
Benton, Fowler	Friday, Dec. 21	
Alonso Sleeper, Fowler	Saturday, Dec. 22	
Noble, Albion	Monday, Dec. 17	McMahan. Prof. Latta.
Wm. Talbert, Albion	Tuesday, Dec. 18	
Allen, Ft. Wayne	Wednesday, Dec. 19	McMahan. Skinner.
Alex. Johnson, Ft. Wayne	Thursday, Dec. 20	
Miami, Peru	Friday, Dec. 21	McMahan. Prof. Huston.
W. C. Bohn, Peru	Saturday, Dec. 22	
Decatur, Sandusky	Monday, Dec. 17	Miss Clarke. Hobbs, E. M. C.
B. F. Gaston, Sandusky	Tuesday, Dec. 18	
Bartholomew, Hope	Wednesday, Dec. 19	Hobbs, E. M. C. Miss Clarke (T.).
C. R. Haymond, Hope	Thursday, Dec. 20	
Shelby, Shelbyville	Friday, Dec. 21	Miss Clarke (F.). Hobbs, E. M. C.
A. W. Tindall, Shelbyville	Saturday, Dec. 22	
Hamilton Noblesville	Wednesday, Dec. 19	Miss Clarke (W.). Stockwell.
T. J. Lindley, Noblesville	Thursday, Dec. 20	
Hendricks, Danville	Friday, Dec. 21	Stockwell. Miss Clarke (S.).
E. B. Davis, Cartersburg	Saturday, Dec. 22	
Johnson, Franklin	Monday, Dec. 17	Husselman. Johnson, D. B.
L. B. Clore, Franklin	Tuesday, Dec. 18	
Jay, Portland	Wednesday, Dec. 19	Husselman. Prof. Arthur.
W. A. Hart, New Mt. Pleasant	Thursday, Dec. 20	
Wayne, Cambridge City	Friday, Dec. 21	Husselman. Hobbs, C. M.
T. O. Henby, Dublin	Saturday, Dec. 22	
Vigo, Terre Haute	Wednesday, Dec. 26	McMahan. Prof. Latta.
C. C. Belt, Edwards	Thursday, Dec. 27	
Montgomery, Crawfordsville	Friday, Dec. 28	McMahan. Prof. Plumb.
J. M. Harshbarger, Ladoga	Saturday, Dec. 29	

JANUARY.

Vermillion, Dana	Wednesday, Jan. 2	Lane. Mrs. Bates.
E. W. James, Dana	Thursday, Jan. 3	
Carroll, Flora	Friday, Jan. 4	Lane. Keim.
Noah Fouts, Deer Creek	Saturday, Jan. 5	
Jackson, Seymour	Wednesday, Jan. 2	Husselman. Cooperider.
J. B. Love, Chestnut	Thursday, Jan. 3	
Putnam, Greencastle	Friday, Jan. 4	Husselman. Prof. Latta.
L. A. Stockwell, Cloverdale	Saturday, Jan. 5	
Wells, Bluffton	Monday, Jan. 14	Hart. Mrs. DeVilbiss.
J. W. D. Metts, Ossian	Tuesday, Jan. 15	
Blackford, Hartford City	Wednesday, Jan. 16	Mrs. DeVilbiss. Husselman.
J. C. Moore, Hartford City	Thursday, Jan. 17	
Adams, Decatur	Friday, Jan. 18	
C. D. Kunkle, Monmouth	Saturday, Jan. 19	

JANUARY—Continued.

PLACE OF MEETING AND CHAIRMAN OF INSTITUTE.	DATE.	ASSIGNED SPEAKERS.
Jasper, Rensselaer	Monday, Jan. 14.....	Randel. Mrs. Bates.
R. D. Comer, Rensselaer.....	Tuesday, Jan. 15.....	
Starke, North Judson.....	Wednesday, Jan. 16.....	
Timothy Scott, Alldine.....	Thursday, Jan. 17.....	
Pulaski, Star City.....	Friday, Jan. 18.....	Prof. Arthur. Mrs. Bates.
I. L. Washburn, Star City.....	Saturday, Jan. 19.....	
Posey, Poseyville.....	Monday, Jan. 14.....	Lane. Hobbs, C. M.
J. H. Gwaltney, Poseyville.....	Tuesday, Jan. 15.....	
Gibson, Oaklaid City.....	Wednesday, Jan. 16.....	
S. H. Hargrove, Princeton.....	Thursday, Jan. 17.....	
Knox, Bicknell.....	Friday, Jan. 18.....	Lane. Prof. Latta.
Ellis House, Bicknell.....	Saturday, Jan. 19.....	
DeKalb, Waterloo.....	Monday, Jan. 14.....	Mrs. Bloss. Johnson, D. B.
H. M. Widney, St. Joe.....	Tuesday, Jan. 15.....	
Steuben, Angola.....	Wednesday, Jan. 16.....	
J. B. Parsell, Angola.....	Thursday, Jan. 17.....	
Lagrange, Lagrange.....	Friday, Jan. 18.....	Mrs. Erwin. Johnson, D. B.
L. E. Deal, Plato.....	Saturday, Jan. 19.....	
Huntington, Huntington.....	Monday, Jan. 14.....	McMahan. Prof. Huston.
S. C. Mason, Huntington.....	Tuesday, Jan. 15.....	
Kosciusko, Warsaw.....	Wednesday, Jan. 16.....	
N. W. Powell, Clunette.....	Thursday, Jan. 17.....	
Howard, Kokomo.....	Friday, Jan. 18.....	McMahan. Billingsley.
L. C. Hoss, Kokomo.....	Saturday, Jan. 19.....	
Elkhart, Goshen.....	Monday, Jan. 21.....	McMahan. Mrs. DeVilbiss.
Jacob Zolinger, Goshen.....	Tuesday, Jan. 22.....	
St. Joseph, South Bend.....	Wednesday, Jan. 23.....	Trusler. Mrs. DeVilbiss.
E. A. Metzger, Granger.....	Thursday, Jan. 24.....	
Lake, Crown Point.....	Friday, Jan. 25.....	
C. B. Benjamin, Leroy.....	Saturday, Jan. 26.....	
Henry, New Castle.....	Monday, Jan. 21.....	Trusler. Ratliff.
J. H. Hewitt, New Castle.....	Tuesday, Jan. 22.....	
Hancock, Greenfield.....	Wednesday, Jan. 23.....	McMahan. Ratliff.
Alonzo Tyner, Greenfield.....	Thursday, Jan. 24.....	
Randolph, Winchester.....	Friday, Jan. 25.....	McMahan. Mrs. Bates.
E. W. Hill, Winchester.....	Saturday, Jan. 26.....	

FEBRUARY.

Tipton, Tipton.....	Monday, Jan. 28.....	Randel. Billingsley.
John D. Smith, Tipton.....	Tuesday, Jan. 29.....	
Clinton, Frankfort.....	Wednesday, Jan. 30.....	
D. F. Mai-h, Frankfort.....	Thursday, Jan. 31.....	
Tippecanoe, Lafayette.....	Friday, Feb. 1.....	
J. E. Marshall, Montmorenci.....	Saturday, Feb. 2.....	McMahan. Mrs. Erwin.
Rush, Rushville.....	Monday, Feb. 4.....	
E. A. Frazee, Orange.....	Tuesday, Feb. 5.....	
Franklin, Brookville.....	Wednesday, Feb. 6.....	
J. H. Cook, Sharpton.....	Thursday, Feb. 7.....	McMahan. Mrs. Bloss.
Madison, Anderson.....	Friday, Feb. 8.....	
Clifford Wood, Pendleton.....	Saturday, Feb. 9.....	

FEBRUARY—Continued.

PLACE OF MEETING AND CHAIRMAN OF INSTITUTE.	DATE.	ASSIGNED SPEAKERS.
Morgan, Mooresville.....	Monday, Feb. 4.....	Somers.
Nixon Henley, Monrovia.....	Tuesday, Feb. 5.....	Stockwell.
Delaware, Muncie.....	Wednesday, Feb. 6.....	Somers.
W. M. Schafer, Royerton.....	Thursday, Feb. 7.....	Stockwell.
Marion.....	Wednesday, Feb. 6.....	Collins.
W. B. Flick, Lawrence.....	Thursday, Feb. 7.....	Mrs. Bloss.
Boone, Lebanon.....	Friday, Feb. 8.....	Collins.
W. G. Vandever, Lebanon.....	Saturday, Feb. 9.....	Mrs. Erwin.
Whitley, Columbia City.....	Monday, Feb. 11.....	Husselman.
John Dietrich, Larwill.....	Tuesday, Feb. 12.....	Dolph.
Marshall, Plymouth.....	Wednesday, Feb. 13.....	Johnson, A.
E. S. Freese, Twin Lakes.....	Thursday, Feb. 14.....	Mrs. DeVilbiss.
Fulton, Rochester.....	Monday, Feb. 11.....	Prof. Latta.
E. C. Mercer, Rochester.....	Tuesday, Feb. 12.....	Mrs. DeVilbiss.
Porter, Valparaiso.....	Wednesday, Feb. 13.....	Husselman. Mrs. Erwin.
A. B. Lantz, Hurlburt.....	Thursday, Feb. 14.....	
Laporte, Laporte.....	Friday, Feb. 15.....	
W. A. Banks, Laporte.....	Saturday, Feb. 16.....	
Fayette, Connersville.....	Tuesday, Feb. 19.....	Billingsley.
W. K. Porter, Connersville.....	Wednesday, Feb. 20.....	Collins.
Union, Liberty.....	Thursday, Feb. 21.....	Prof. Plumb. Prof. Latta. Billingsley.
M. C. Keffler, Cottage Grove.....	Friday, Feb. 22.....	
	Saturday, Feb. 23.....	

ADDITIONAL INSTITUTES HELD UNDER STATE AUSPICES.

In a number of instances the direct apportionment of \$25 to each county was not wholly expended upon the annual meeting. In all such cases opportunity was given to use the unexpended balance upon the second meeting if held before the close of the season ending March 31. The following list gives the counties holding second meetings and also the date and place of holding same.

County.	Postoffice.	Date.
Warrick.....	Yankeetown.....	February 6-7.
Lawrence.....	Williams.....	February 16.
Randolph.....	Ridgeville.....	February 28.
Starke.....	Knox.....	February 28 to March 1.
Scott.....	Blocher.....	March 1-2.
Jennings.....	North Vernon.....	March 2.
Howard.....	New London.....	March 2.
Johnson.....	Greenwood.....	March 6-7.
Sullivan.....	Burchard.....	March 13-14.
Jefferson.....	Bellevue.....	March 13-14.
Pulaski.....	Star City.....	March 14.
Owen.....	Gosport.....	March 22-23.

INDEPENDENT INSTITUTES HELD.

For several years a number of the counties have held, regularly or occasionally, independent institutes. In some cases these meetings have been held before or after the annual meeting, but within the season named in the institute act, namely, between November 1st and March 31. These have usually been one-day meetings with morning and afternoon sessions and sometimes, also, an evening session. Several of the counties have held midsummer open-air meetings with morning and afternoon sessions. A basket dinner has been a pleasant and highly social feature of these midsummer institutes. These meetings being entirely independent and supported wholly by local funds, the Superintendent has left their management to the local authorities, but he has given suggestions, information and advice when sought and has gladly aided in securing speakers and special transportation for same when desired.

ATTENDANCE AT FARMERS' INSTITUTES.

The table which follows shows the number of sessions and the average attendance at each institute during the past year. For the sake of comparison, the average attendance for each of the two years previous is also given:

County.	Number Sessions Held.	Average Attendance.		
		1900-1901.	1899-1900.	1898-1899.
Adams	5	208	206	205
Allen	5	167	286	199
Bartholomew	5	508	480	515
Benton	4	260	43	171
Blackford	4	463	161	155
Boone	4	212	340	60
Brown	5	70	123	124
Carroll	4	185	102	81
Cass	4	122	173	164
Clark	5	38	57	100
Clay	5	184	77	192
Clinton	5	403	375	222
Crawford	5	89	96	56
Davless	5	163	316	335
Dearborn	5	88	123	100
Decatur	5	168	174	381
Dekalb	5	407	372	267
Delaware	4	240	124	89
Dubois	5	204	155	184
Elkhart	5	754	785	390
Fayette	4	204	109	145
Floyd	5	94	90	50

County.	Number Sessions Held.	Average Attendance.		
		1900-1901.	1899-1900.	1898-1899.
Fountain	5	123	194	143
Franklin	5	326	188	272
Fulton	5	528	682	665
Gibson	5	189	277	185
Grant	5	400	359	456
Greene	5	192	69	45
Hamilton	5	162	244	315
Hancock	5	315	353	257
Harrison	5	305	260	190
Hendricks	4	205	331	287
Henry	5	795	860	735
*Howard	8	180	288	260
Huntington	4	401	560	561
Jackson	5	136	170	152
Jay	5	163	227	216
Jasper	6	207	219	170
*Jefferson	10	178	195	201
*Jennings	7	119	63	46
*Johnson	9	320	321	294
Kosciusko	5	521	615	530
Knox	5	720	646	451
Lagrange	5	436	642	602
Lake	5	377	229	227
Laporte	5	300	360	153
*Lawrence	7	131	67	39
Madison	5	1,060	450	339
Marion	5	190	167	90
Marshall	5	753	440	310
Martin	5	47	35	107
Miami	5	108	212	166
Monroe	5	182	172	131
Montgomery	5	157	290	403
Morgan	5	252	406	289
Newton	5	83	108	97
Noble	5	115	197	285
Ohio	5	94	136	83
Orange	5	344	204	304
*Owen	10	97	148	122
Parke	4	311	354	260
Perry	6	166	311	159
Pike	5	162	217	169
Porter	5	298	165	148

* Held two Institutes.

County.	Number Sessions Held.	Average Attendance.		
		1900-1901.	1899-1900.	1898-1899.
Posey	5	445	414	372
*Pulaski	8	144	179	173
Putnam	5	370	386	274
*Randolph	8	353	397	590
Ripley	5	134	152	136
Rush	4	381	154	178
*Scott	10	165	133	121
Shelby	5	474	500	313
Spencer	5	244	199	183
*Starke	6	132	107	108
St. Joseph	5	1,105	1,000	1,500
Steuben	5	360	465	402
*Sullivan	10	64	101	98
Switzerland	5	168	285	259
Tippecanoe	4	215	163	261
Tipton	5	470	586	525
Union	6	261	216	305
Vanderburgh	6	151	181	195
Vermillion	5	170	62	67
Vigo	4	184	130	205
Wabash	4	213	129	234
Warren	5	135	85	60
*Warrick	10	108	189	163
Washington	6	93	299	151
Wayne	5	217	265	420
Wells	7	640	416	466
White	5	133	117	66
Whitley	5	470	353	146
General average.....		279	269	250
General average, 1899-1900.....			269	
General average, 1898-1899.....				250
General average, 1897-1898.....				272
General average, 1896-1897.....				232
General average, 1895-1896.....				272
General average, 1894-1895.....				118

While only forty-two counties show an increase in the attendance the past year as compared with the previous years, it is gratifying to note that the average for the State is larger than in any previous year. A study of the table suggests several interesting questions. Does the fact that a majority of the counties show a decreased attendance indicate a

*Held two Institutes.

decline of the institute work? If so, how can we account for the increased attendance in the other counties? Does a decreased attendance indicate a want of prosperity among the farmers, or is it due to the inefficiency of the general or local management of the institute work? Let us give these questions a little consideration. Attention is therefore called to the following points:

1. A study of the table will show that the increase or decrease in the attendance is not due to locality, as there are wide fluctuations in the attendance in counties near each other.

2. It will also show that the attendance has not been affected by the degree of prosperity enjoyed, as wide fluctuations are noted in the attendance in counties where the agriculture is in a highly prosperous condition.

3. The falling off in attendance in many counties can not be due to any general decline in agriculture, as the striking gains in the attendance of a minority of the counties have actually increased the average for the entire State.

4. The weather at the time of holding the institutes can not be held accountable for the shrinkage in attendance in so large a number of counties. This is clearly shown in the fact that meetings held near each other the same week show wide variations in the attendance.

5. The general management can not be held accountable for the falling off in attendance in many of the counties, as all the counties have been treated exactly alike by the general committee on institutes. Each county has received the same direct apportionment of funds for local expenses as other counties. Several weeks before the opening of the institute season a complete list of speakers and schedule of meetings were sent to each chairman so that each had notice in ample time for the necessary preliminary arrangements; in short, the general management gave to every county an equal share of attention and support and therefore can not be responsible for the fluctuations in attendance.

6. Interest in the political campaign may be accountable for the unfavorable showing in some of the counties. In a few instances the chairmen wrote that they could not do anything in the way of preparation for their respective institutes previous to the election, because the attention of the people was fully absorbed in the campaign. However, this explanation will serve for a limited number of counties only.

7. It is probably true that in some counties there was a prevailing indifference or apathy toward the institute work from some cause or other. A few chairmen have complained of this condition of things. It hardly seems probable that this is the explanation of a decreased attendance in many cases. The reason for this conclusion is found in the fact that changes in the local management have resulted in the increase or decrease, in attendance in accordance to the fitness of those in control of the work.

8. As the places of meeting in the several counties are generally the

same from year to year, any decrease in attendance as compared with the former year can not be charged to the lack of hall capacity.

9. It is possible that a reported decrease in the attendance in some counties might be due to errors in counting or estimating the number present. It is believed that, as a rule, the figures reported are approximately correct, for the reason that both assigned speakers and secretaries are uniformly requested to ascertain the number present by actual count, if possible, or by careful estimate. The averages of the figures reported are taken in making up the average attendance, which must, therefore, be approximately correct.

10. There seems to be but one plausible explanation of the falling off in attendance in so many counties and that is the lack of time and thoroughness in preparing for and advertising the meetings on the part of the local managements. It would not be just in all cases to charge the decreased attendance to the local management. The reports of speakers and secretaries show beyond peradventure, however, that there are very great differences in the thoroughness with which the preparatory work is done. It frequently happens that a change in the chairman results in the falling off or increase in numbers which strongly indicates that that officer may have much to do with the attendance at the institute. It is due the chairmen, however to say that in almost all cases they have labored earnestly, though sometimes ineffectively, in making the preliminary arrangements for their several institutes. It is hoped that in the future the chairmen may recognize increasingly the importance of their office and vie with each other in their efforts to swell the numbers at their respective institutes and thus diffuse more widely the benefits of the work.

EXPENDITURE OF THE INSTITUTE FUND.

The following is a classified statement of disbursements of the institute fund for that portion of the year ending May 31, 1901, as taken from the books of the Superintendent of Institutes. The unexpended balance shown below will be used to defray the expenses of conducting the work during the rest of the fiscal year ending October 31:

Bills of chairmen.....	\$2,178 09
Traveling expenses of speakers and superintendent...	993 08
Per diem of assigned speakers.....	1,244 15
Stenographic and other clerical work.....	251 80
Printing and stationery.....	101 59
Postage	92 00
Supplies	4 50
Telegrams, freight and express.....	13 62
Miscellaneous	1 50
Unexpended balance May 31, 1901.....	119 67
	<hr/>
	\$5,000 00

PLANS FOR THE FUTURE.

The General Assembly of 1901 increased the appropriation for farmers' institutes to \$10,000 per annum. This will make possible a much needed improvement and extension of the work. After careful consideration the general committee on institutes, consisting of the President of Purdue University, the Director of the Agricultural Experiment Station and the Superintendent of Institutes, reached the following tentative conclusions:

1. That the number of institutes should be considerably increased.
2. That the quality of the instruction given should be improved by engaging a larger number of experienced workers and providing better means of illustration.
3. That the additional meetings decided upon should be so placed as to accommodate the farmers to whom the annual meetings, which are usually held at the county seat, are comparatively inaccessible.
4. That, if practicable, occasional district meetings be held for the purpose of encouraging the development of some special line of agriculture, as dairying, stock raising, gardening, fruit culture, sugar beet growing, etc.
5. That the Annual Conference of Institute Officers and Workers be made a regular feature of the work hereafter, and that an effort be made to have every county in the State represented at these annual gatherings.
6. That the superintendent should devote more time to personal supervision, especially in the counties in which the work has not yet become well established.
7. That, wherever necessary, an earnest effort be made to enlist the most successful and intelligent farmers, fruit growers, stockmen, dairymen, gardeners, etc., in the institute work in their respective counties.

Before final adoption the plans of the general management were submitted to a considerable number of experienced chairmen and institute workers. The plans, as outlined above, met with almost unanimous approval. Those who were consulted emphasized especially the need of more and better institutes and a closer supervision on the part of the superintendent. So general and so hearty has been the approval of the plans outlined that the general management feels justified in adopting the same, subject to such revision from time to time as experience may warrant.

All the chairmen were promptly informed as to the future plan of the work, and invited to co-operate with the general management in carrying the same into execution. At this writing nearly all the chairmen have responded expressing their willingness to assist the general management in an earnest effort to extend and improve the institute work. An annual institute will be held, as heretofore, in each county, with an allowance of not to exceed \$25 to cover local expenses and an assignment of two speakers, expenses paid by the general management. For additional meetings, to be held near the boundaries or corners of the counties, speakers

only will be assigned. The county chairman will be permitted to use all of the direct allowance of \$25 upon the annual meeting if needed, or reserve a portion for a supplemental meeting, if this is preferred. It is believed, however, that there are many small towns throughout the State in good farming communities that will cheerfully furnish a hall and meet other necessary local expenses in order to secure the services of an effective speaker or two, assigned by the general management, without expenses to the locality. In case the people of any locality desire one of these supplemental institutes they should take up the matter with the county chairman, who will, no doubt, be glad to co-operate with them and the general management in arranging for a meeting. It is believed that by holding forty or more supplemental meetings each year and carefully placing them, it will be possible within each period of two years to hold an institute within the reach of every farmer in the State.

Many agencies have contributed to the success of the institute work the past year. The railway companies have continued their substantial support by granting heretofore, special rates to the speakers. There has been a very general disposition on the part of the newspaper men to lend cordial support to the work. Many men and women have rendered gratuitous service at home and at nearby institutes. The local officers, including chairmen, secretaries and program committees, have, as a rule, done effective work. These local officers have almost, without exception, received no compensation, and many of them have made no charge for expenses incurred in behalf of the work.

The President of Purdue University and the Director of the Experiment Station have given valuable suggestions and advice. The undersigned takes pleasure in expressing his appreciation of the generous and hearty co-operation rendered, and he respectfully requests the same kind of co-operation and support in the future.

W. C. LATTA,

Superintendent Farmers' Institutes.

Purdue University, Lafayette, Ind., May 31, 1901.

PAPERS READ AT FARMERS' INSTITUTES BY LOCAL SPEAKERS.

COW PEAS.

A. E. KRUSE, GRANDVIEW.

[Read before the Spencer County Farmers' Institute.]

Cow peas have been grown in the southern States for a great number of years. But not until very recently have they made their appearance as far north as Indiana to any great extent. But one characteristic of the Indiana farmer is his resource. If any one particular essential crop fails him he is looking for a substitute. Aided by the tests of our experiment stations, by scientific research and by the practical feeding upon the farm, the farmer of southern Indiana has learned to know and appreciate that cow peas are one of the most valuable forage crops as well as a soil renovator that it is possible to grow on the farm.

Why the peas have not been grown in northern or central latitudes sooner may be ascribed to various reasons, the principal one of which may probably be that while the soil was in its virgin state, full of all the essential plant foods in the right proportions, the farmer had, or rather thought he had, no need for a crop that would gather from the air and from the subsoil and stow in the surface soil that which he already had an abundance of.

Then again, he may not have understood his wants or have known how best to supply them, and when he did learn to appreciate the value of a leguminous forage crop, these were the clovers with all their attributes to supply his wants.

But even now, with the condition existing on the average farm, it seems almost an impossibility to secure a maximum or even an average crop of red clover; at least such seems to be the fact.

With the limited supply of soil humus or decaying vegetable matter in the soil, and also the limited amount of stable and barnyard manure on most farms, to secure soil moisture and nourishment when the young clover plant most needs it, with the removal of snow and windbreaks, allowing the cold northwest wind free play, it is an absolute fact that when you approach a good many Spencer County farmers concerning their clover crop they will tell you something like this: "Hot and dry weather

burnt it all out," or, "I didn't get a good stand," or if the ground, seed and manner of seeding were such as to secure a good stand, and it did withstand a dry season, a severe winter has probably winter-killed it; or, even if it did withstand the rigors of a severe winter there is still a chance for the army worm to come along and mow it all clean, leaving the farmer only the bare field, after a year of forlorn hope. In his extremity the farmer is looking for a substitute. Experience and practice have taught him that there is nothing better than cow peas.

They are subject to none of the aforesaid ills. For, while they embrace all of the superior qualities of red clover as a forage crop and as a soil builder, creating humus and gathering plant food, it is not intended by this to say that cow peas ever will or even should supplant clover, but rather to supplement it. Moreover, while the acreage of clover in Indiana has decreased considerably in the last ten years, the decrease in yield is still more marked, falling from two tons per acre in 1889 to a little more than one and one-half tons in 1898.

There are a large number of varieties of cow peas, distinguished by their habit of growth, color, shape and size of seed.

They occur in every gradation of habit in regard to growth, from an upright bush having short, lateral branches to those with runners lying prostrate upon the ground, from ten to twenty feet in length. There is a like variation in the length of time the different varieties require to ripen seed, some maturing in eight or ten weeks, while others require almost as many months.

There seems to be also a constant relation between the time required for attaining maturity and the habit of growth, the bush varieties ripening in a shorter season than the trailing varieties.

But, according to J. G. Smith, in his farmers' bulletin on cow peas, issued by the Department of Agriculture, at Washington, a bush variety taken from the northern States to the longer season in the south, will, in the course of a few years, assume the trailing habit and lengthen its period of growth.

While, on the other hand, if a trailing variety, requiring from seven to eight months for reaching maturity, be removed to northern latitudes. It will gradually accommodate itself to the shorter season, at the same time shortening its runners, approaching more and more to the bush habit of growth.

If this be true, as by limited observation I believe it to be true, the northern farmer will necessarily have to obtain fresh seed of the trailing varieties of the south to insure a maximum growth of forage.

Owing to its sure and rapid growth and its high feeding value, there is no forage plant better adapted to the present needs of the Spencer County farmer than the cow pea.

It will produce heavy crops upon rich soils, while upon poor or worn out lands it will make quick and profitable response to a liberal applica-

tion of fresh stable or barnyard manure, absorbing and fixing within the soil its fertilizing properties. At the same time the larger growth of vine and leaf induced will gather and stow in the soil, for the use of future crops, larger quantities of that most costly of all plant foods when purchased in the shape of commercial fertilizers, namely, nitrogen.

Every acre of every farm, whether rich or poor, has resting upon it hundreds of tons of atmospheric nitrogen, a certain quantity of which can be transformed within the soil into available plant food every time the farmer grows a crop of cow peas or red clover. Just how this is done and why this is the fact does not concern the average farmer so much, but the fact that it is accomplished and that the cow peas were the instruments in his hands to bring about this happy result is what concerns him most.

The roots of cow peas, like the vines of the trailing varieties, are numerous and grow to great lengths, extending far down into the subsoil where their decaying loosens it up, making it more porous and friable and of better tilth, supplying more humus, being therefore in a better condition to retain moisture, withstand a severe drought, absorb water more readily and be less liable to wash under heavy downpours of rain.

While the roots and stubble of cow peas do not contain as great a fertilizing value as the vines, still it is considerable. Neither is the fertilizing value of the vines as great as their feeding value, proven by actual experimental tests.

To leave the whole crop of vines lay on the ground much loss of plant food would result during the winter, while to plow them under, leaving the surface soil bare, subject to leeching and washing, would also result in much needless loss.

The best and most economic method, then, would be to cut the forage for hay, feed to stock on the farm, carefully save the manure and return it to the soil again where it rightfully belongs, as the greatest part of the fertilizing constituents are recovered in the manure and carefully saved.

But, however, if the vines are plowed under in the autumn, a winter crop such as rye or wheat should be sown to prevent the washing and leeching action of the winter freezes and rains.

The feeding value of cow pea hay, as proven by chemical analysis, experimental feeding tests, and by practical feeding upon the farm, is equal to the very best, not even excepting red clover hay. It is relished by all kinds of stock that will eat any kind of hay.

For a soiling crop, to be fed green to stock in the fall during the season of short pastures, it is equally good.

It is especially rich in protein, which, like the nitrogen of the soil, is the most expensive element of animal food.

One hundred pounds of cow pea hay contain a little more than sixteen and one-half pounds of protein, of which nearly eleven pounds are digestible, in comparison with a little over twelve pounds for red clover hay,

of which only a little more than six and one-half pounds are digestible, while timothy contains less than three pounds of digestible protein, and corn stover about two pounds. This is according to tables prepared by E. W. Allen, assistant director in the office of experiment stations at Washington.

It has also been found by comparing the food wants of animals with the food elements of cow peas that they contain more protein in proportion to other food elements demanded by most, and especially mature animals. Thus, to secure their full feeding value they should be fed in connection with some other forage deficient in protein, such as timothy hay or crabgrass, the latter often, and especially in wet seasons, growing up in sufficient quantity among the vines.

For green pasturage for hogs we have numerous reports of excellent results, especially of young shoats thriving upon the juicy foliage and the seeds in the ripening pods.

At the Alabama experiment station tests were made of the comparative value of cow pea pasturage and corn, with corn alone. Six shoats were used in the experiment, divided into two lots of three shoats each.

It was found that when corn was fed alone it required nearly twice as much corn to make one pound of gain as when the pigs had access to both cow pea pasturage and corn. The pigs on cow pea pasturage had better appetites, ate more corn, and made nearly three times as much growth as the pigs fed on an exclusive corn diet, and they made that comparative rapid gain at a less cost per pound.

In another test at the same station, to find the feeding value of ground cow peas and corn, equal parts, as against ground corn alone, it was found that a little over five pounds of the former made one pound of gain, while it required more than eight pounds of the ground corn alone to make the same gain; and that, while the lot fed corn alone made sixty-eight pounds of gain, the lot fed equal parts of cow peas and corn made a gain of 108 pounds during the same period of time.

Chickens eat the ripe seeds and do well on them, especially young chicks, which thrive on the cracked peas and seem to relish them.

The chief functions, then, if cow peas, are mainly as a supplement to clover for forage in case of a diminished yield or total failure of the latter and to supply a highly nitrogenous food in the ripe seeds.

With proper preparation of the soil, which means that the ground should be thoroughly plowed and pulverized and sufficiently warm and moist, but not too wet, by a thin application of manure if on thin soil; by the careful and methodical planting of the seed, with either a corn or wheat drill, the latter preferred, providing the feeds are so arranged that they do not crack or grind the seeds, thus insuring the proper and uniform depth of seeds, covering them from two to three inches, we have but to await the results, which will surely be that hard and compact soils will be left more friable, poor and partially worn-out soils will be left richer

by the addition of many pounds of available plant food in the shape of nitrogen abstracted from the air and fixed in the roots and stubble for the use of succeeding crops.

By the securing of good yields of forage which, for hay or for green feeding, will take the place of more expensive and concentrated nitrogenous foods, the farmer will thus be enabled to feed more stock better feed. Hence, to secure the full value of cow peas, they should be fed to stock on the farm, insuring better growth and more and better manure, which should be carefully saved and returned to the soil, where it belongs, thus securing an addition to the capital stock of the farmer, which is the available plant food within the soil.

During the season of 1900 we grew two varieties of peas—the Clay and Whip-poor-will. Not having kept the exact date of planting and harvest I will give them as well as I can remember:

May 20th we planted three acres of Clay peas. The ground was what should have been a clover sod, but just when the clover was most wanted it failed to be there. Ground was plowed first week of May, thoroughly harrowed and pulverized just previous to planting. On about two acres we plowed under a thin coat of fresh stable manure, the only fertilizer used. The seed was guaranteed to be southern grown, and we supposed it was, as it contained a liberal sprinkling of cotton seeds; it was sown with a grain drill, using every third hoe, thus placing the rows two feet apart. We intended to cultivate these and then turn down the green vines in the fall and seed to wheat, but the continued wet weather when we should have been about it prevented cultivation, and when it came time to turn them under it looked too much like an impossibility. Vines ten feet long and sometimes longer twisted and tangled in every conceivable shape. The vines were intermixed with a liberal sprinkling of crabgrass. About August 20th we cut them for hay, taking off the outside swath-board, or track-cleaner, of machine, so as to let the vines drop just as they were cut; having on the inside shoe of cutterbar a rod extending forward and upward, it would run up on the vines, thus cutting every swath clear of every other swath. After curing two days on the ground, we raked same way we cut, thus keeping every swath to itself in the windrow, making it very easy to pick up with fork and load on wagon; after curing another day in windrow, the hay was hauled to the barn. From this three acres we secured seven good, large loads of well-cured hay, making not less than six tons, or two tons per acre. The vines where the manure was turned under were fully twice as rank as on the other ground, though the soil, if anything, was poorer. The vines were cut just at the time when the first leaves were turning yellow, and at that time there were no pods and only an occasional bloom. By the middle of September the stubble had made another good growth of vines, which was turned under for wheat, there being again a marked difference in the growth upon the soil receiving manure and that which was not manured, the growth on

the manured soil being much more luxuriant than on the soil which had received no manure. One rolling and two harrowings put the soil in good order for wheat.

June 1st we sowed about one-half acre of Clay peas and Whip-poor-will, side by side. The rows were sown sixteen inches apart, using every other hoe or drill. The soil and manner of sowing was practically the same.

About the middle of August, or in two and one-half months, the Whip-poor-wills had matured seed and the leaves had mostly turned yellow, while the Clays were still fresh and green, notwithstanding the dry weather, and were growing vigorously, only an occasional bloom being seen. They were left standing to see if they would mature seed by the 20th of September, or nearly four months after planting, when they were cut, most of the leaves having dropped off by this time, only an occasional pod of seed being found. The Whip-poor-wills by this time were entirely dead, only the dry stems and ripened pods being left.

In the matter of forage we feel confident of not misstating the facts if we say that at the proper time to harvest each the Clays would have produced more than twice as much hay as the Whip-poor-wills. The Clays were sown at the rate of three-quarters bushel per acre, while of the Whip-poor-wills we sowed one bushel per acre. In the case of the Clays, sown May 20, we also used three-quarters bushel of seed per acre.

From July 12 to 15, after wheat had been removed, we broke about three acres of wheat stubble and sowed to Whip-poor-will peas, sowing one bushel of seed per acre. These matured ripe seed by the last of September. We cut them with a mowing machine, fastening a table behind the cutter-bar, and one man followed with hand rake to keep them raked back and to rake in bunches. After leaving them lay in bunches for several days they were hauled to the barn, where they were afterwards hulled with a corn shredder. We secured thirteen two-bushel bags full of seed from the three acres. The forage was not considerable, amounting to about two tons, which, however, makes splendid feed after passing through the shredder and being fed with a mixture of shredded fodder.

As to hulling peas with a corn shredder, about the only available machine for the purpose, we have heard various reports as to the quantity and quality of work they will do—some good, some bad, and others indifferent.

Our own observation, however, has led us to the conclusion that if the machine is properly operated, nearly or about all of the seeds can be saved, few being cracked and these passing out with the forage.

In conclusion I want to say: If Mr. Husselman shows you how to grow good crops of clover with your existing conditions, good and well; if, however, your conditions fail to meet the requirements, do not waste too much valuable time experimenting with new varieties while your stock and your soil are crying for nourishment, but sow cow peas.

COW PEAS AS A FORAGE PLANT AND FERTILIZER.

U. COULSON, SULLIVAN.

[Read before the Sullivan County Farmers' Institute.]

Mr. President—When I received notice that this subject was assigned me, I felt as though I was not sufficiently informed to impress upon this body of practical farmers the importance that the subject demands, and the beneficial results that are sure to follow by having a more intimate knowledge of the cow pea as a forage plant and a fertilizer. That you may more fully understand the basis for my conclusions and the faith that is in me, I will state that they were derived from reading all of the authority that I could get upon the subject, as well as from inspecting large fields of the plant and in talking with planters in Missouri, Arkansas, Tennessee, Alabama, and Louisiana, especially the latter State, where all the circumstances were favorable for forming a correct conclusion. In Madison Parish, La., one year ago, I spent four weeks and rode over hundreds of acres of this, the forage plant of the South as well as the fertilizer of the same. I would mention the plantation of the Maxwells, and also that of Miss Lu Lucas, these people being the foremost and most successful planters of the Parish. On the plantation of the latter I saw seventy-five head of mules and other stock to correspond with the surroundings, all fat and sleek, fed exclusively upon pea hay. From Miss Lucas, who is a bright business lady, I received valuable information as to the nutritious qualities of the pea as a forage, and its great value as a fertilizer in reclaiming worn-out land. These facts were gained after years of experience. It would be a very dull farmer indeed that would not note the difference in a field of cotton or a field of corn that followed a crop of peas. If this does not satisfy the most skeptical, let him take a look at the fat, sleek stock; drink of that creamy milk, with a particular and pleasant taste only known where the pea is the provender; and taste the rich golden butter, equal to any creamery, and that, too, without the aid of any artificial coloring.

On the plantation of Mr. Maxwell I was shown seventy-five head of steers which he was feeding for market exclusively on peas by pasturing. The steers looked scrubbish, but were fat and some of them showed seventeen hundred pounds each, actual weight. There is no question about these being facts. I neither expect to convince nor convert the "Doubting Thomas," but the wide-awake farmer, who wishes to improve his soil in productiveness, his surroundings and that of his family; provide better education for his children; have more spare time to devote to other busi-

ness or pleasure, and above all if he wishes the satisfaction of beholding his rich harvest ripening, and to feel that his labor has not been in vain, such a one can not fail to be open to conviction.

Can cow peas be grown successively in this climate (southern Indiana)? I say yes, most assuredly. Last June I planted twelve acres, one bushel to the acre; drilled them in with a wheat drill. The yield and quality were beyond expectation for thin land and a wet season, and I have been feeding them ever since harvesting them, and as a forage I find them a good substitute for corn and hay. Mine made about two tons to the acre, but I have seen them growing where I thought they would make twice that amount. I would advise farmers to be careful as to the kind, as there are about thirty varieties, and they do not all mature in this climate like they do in the Southern States.

I have very crudely attempted to show what the cow pea does; now let us see what it is. It belongs to the family of plants known as the legume, or leguminous—meaning gathering without cutting. It is one of those plants that is industrious, working by day and by night, no time being lost from the time it commences taking root and putting forth its leaves until its task is done. Its roots have extended deep into the earth, brought up and distributed through the soil those elements stored away in great abundance, necessary to the growth, development, and maturity of plant life. The leaves and the vines are neither tardy nor slow in their part of the work. As soon as the sun shines on their heads, they open wide the port of entry and gather from the air, the sunshine, the dew, and the moisture, and complete a full ration for man, beast, or fowl, and store in the soil that which gives life and vigor to other plants in after years. I am aware that some of these propositions are doubted. Do not decide hastily, but study the subject well for yourselves. We are all wiser after thorough investigation.

Why should this homely cow pea be classed at the head of the leguminous plants by men of science in agricultural colleges of the various States as well as in those of the United States? True to its name—gathering without cutting—the blessings of heaven come in various ways, and those who have a crop of peas when corn is dear, hay scarce, and oats nearly worthless by reason of continuous rains at harvest time, ought to be truly thankful. But let us get at this subject in a more comprehensive manner so that we all can have a better understanding of it. As cow peas have been classed with clover and other leguminous plants by all scientific men and experienced professors in agricultural colleges, etc., it is a fairly well-established fact that it is the business of this plant to draw phosphoric acid and potash from the subsoil which underlies the soil, as well as to gather nitrogen from the atmosphere, which is without color, taste or smell, and by and through the roots, stems, and leaves forming a combination that is valuable as plant food, and this combination produces what we get in our cereals and meats—protein—which is absolutely necessary

to sustain human and animal life. While it is claimed by some eminent chemists and geologists that protein is a distinct substance, the basis of animal tissue and of vegetable origin, and while by others it is claimed and generally accepted as true that it is a combination of mineral and vegetable, yet, let this be as it may, all scientific men and writers agree that protein is one of the great factors in sustaining life in human beings as well as in animals. The Agricultural Department at Washington, D. C., recently published the analysis of peas and beans, and says: "Chemical analysis alone should give legumes the very highest place among foods, containing as they do more protein than the best cuts of meat and in some cases a larger percentage of fat, besides a considerable amount of starch. Pound for pound, they would be more valuable than meat or our best cereals." The Minnesota Experiment Station found the same facts to be true. Tennessee has given the subject a good deal of attention, and places the pea at the head of the list as forage and fertilizer. I am of the opinion that a continuous sowing of peas on the same ground many years in succession would exhaust the potash, and the soil would become pea-sick just the same as land is dubbed "clover-sick."

From the fact that potash and phosphoric acid are much more easily and cheaply supplied than nitrogen, I am convinced that it would be good farming to be liberal in the cultivation of peas as a fertilizer as well as a forage crop. Each farmer should investigate and become familiar with his necessities and then apply the remedy.

THE TOMATO.

ISAAC WHITELEY, CAMBRIDGE CITY.

[Read before the Wayne County Farmers' Institute.]

It hardly seems probable that the tomato should have been entirely unknown to the civilized world prior to 1492, when Columbus rediscovered America.

It is said that the excellent fruit tomato was regarded with great suspicion as late as 1830 in this country.

The tomato, like the potato, belongs to the night-shade family, and was found growing wild in South America. The French called the tomato *pomme de amour*, and our ancestors called it in English, love-apple; the botanical name of the plant and its fruit is *lycopersicum*, or *solanum esculentum*.

It is a mooted question whether the tomato is a fruit or a vegetable, but we will settle that point just here and now that it is a fruit.

Many that are now present, perhaps, as well as the writer, can remember when it was considered poisonous, and only suited to ornament our mother's mantel, but prejudice gave way to the investigation of science in its researches for the various articles for food, and it was found, notwithstanding its repugnant taste, that by a little use an appetite would be acquired, so that they are almost in general use over the entire world. Not as a staple or nutritious food, but as a luxury and appetizer, they come in the menu of every class of people, from the crowned heads to the humblest peasant, so cheaply can they be produced that no table need be spread without them.

The properties found in the tomato are as follows:

Water	93	76
Protein .....	..	50
Sugar	5	86
Acid (malic).....	..	47
Ash .....	..	56

As will be seen, the tomato contains a large amount of water, the principal nutrient being sugar of different sorts.

When tomatoes are canned, much of the juice is often drained off. The analysis above shows that this entails a loss of about 22 per cent. of the total sugar present. If it is desired to retain all the nutritive qualities in the tomato, the juice should be retained.

THE INDUSTRY.

The cultivation and preparation of the tomato for human food has, perhaps, outgrown almost any other industry in our country at the present time, the fine, growing, lucrative dairy business not excepted.

Some of the New England States were first to embark in the business of canning the tomato. But as the demand for the product grew (and it grew apace) the watchful eye of the enterprising west saw in it an opportunity for an added industry, and we have far outstripped the east in the tomato production.

But we must not fail to say that Indiana is the banner State. Ten years ago there were but few canneries in the State; now there are sixty or more, and between eight hundred and a thousand in the United States.

THE OUTPUT.

A rough estimate may be made of this industry by taking the sixty canneries of this State, each one working on an average of one hundred and fifty acres, and six tons to the acre, which is a common estimate, and bringing at present prices six dollars a ton, or thirty-six dollars per acre, so the farmer can readily see what there is in the tomato enterprise to him.

The cost of producing an acre of tomatoes very little exceeds that of an acre of corn. The cost of plants and setting need not exceed three dollars; the gathering and delivering can be done by unskilled labor, so that the income to the pocket of the farmer from one acre of tomatoes will about equal that of three in corn. Another important fact in this connection that we should not overlook is, while the tomato requires a good rich soil to produce a good crop, the draft on the land is very much less, according to our own observation. Three crops of tomatoes would not impoverish the land more than one of corn.

SOIL BEST ADAPTED.

The best results have been obtained in this locality from clay land or bottom land composed principally of a vegetable mould. A soil composed principally of sand should be avoided, as it dries out and becomes too hot.

THE PROPAGATION OF THE PLANTS.

This part of the tomato culture is so familiar to all that it needs but little comment. The most important point to consider is to have good, strong, stocky plants, obtained by starting in hot-beds and transplanting when two or three inches high in cold frames, and removing to the fields as early as danger of frost is over, thus taking advantage of the full length of the season, which only ends with frost. It is said that in some parts of California the tomato plant will continue to live and produce fruit a number of years.

WHAT TO PLANT AND HOW TO PLANT IT.

C. B. MOORE, SITKA.

[Read before the White County Farmers' Institute.]

The subject of planting must ever remain one of interest to the farmer and one of special interest to that farmer whose soil is becoming exhausted by continual cropping. The farmer must gain his wealth from the product of the soil, and that soil which is most productive is most desirable. We have impaired the fertility of the soil and disturbed climatic influences by clearing away the forest, breaking the prairie sod and cropping continually for fifty or more years. We may restore the same by planting other vegetation having similar growth yet yielding that which will supply our temporal wants. The planting of forest trees, such as are suita-

ble for manufacturing purposes, fencing and fuel, may be recommended in some cases. But to most farmers the fruit, vine, bush and tree will naturally recommend itself, the low-growing fruits taking the place of the original prairie grass. While the vine, bush and tree fruits may take the place of the forest, the farmer furnishing a carpet covering for the land to prevent washing and baking, the latter forming barriers to keep out the cold blasts of winter and the drying winds of summer, and all contributing to the luxuries and necessities of life, giving enjoyment and employment to hundreds of busy hands planting, cultivating and gathering the rich harvests, adding fertility to the soil and wealth to the grower.

A few general directions may apply to the planting of all fruits such as relate to the selection and preparation of the soil. Any soil suitable for grain will do for fruit, but the better the soil the better the crop. Well underdrained land, rolling enough to shed surface water, is best. Sloping to the northeast is best for the tree fruits; a south slope will ripen strawberries earlier and is better for grapes. If intended for small fruit, the land should be made rich before planting, for the vine and tree fruits fertilization may be deferred until after planting. The best and most available fertilizer for the farmer is barnyard manure, and, to obtain best results it should be hauled to the field in early autumn, while the ground is dry, and spread evenly. In spring, when soil is in good working condition, put on disk or spring-tooth harrow and work fine five or six inches deep, then turn with breaking plow eight or ten inches deep, and repeat harrowing until a fine, loose bed is obtained. Now we have a fine, loose bed eight or ten inches deep, suitable for planting any kind of fruit, plant or tree.

First from which we receive returns is the strawberry, fruiting one year after planting. Rich sandy loam is best for strawberries, and planting may be done in early spring when freezing weather is past and soil in good working condition. For field culture rows should be three and one-half or four feet apart, and plants two or three feet apart in the row. If planted in garden and treated to hill culture they may be as close as eighteen inches each way. Strawberries should be planted with crown even with surface of ground and roots well spread out. If the weather is dry, a fine-tooth cultivator should be run shallow between rows the evening of each day's planting and each evening thereafter until plants quit wilting in mid day. Blackberries, raspberries and dewberries all need about the same space and may be planted in a similar way. For field culture rows may be five to seven feet apart and plants two to three feet apart in the row. For garden culture plants may be set three feet each way, and cultivated or mulched. Currants and gooseberries are very similar in habits of growth, and do best in moist, rich soil; may be planted same distance as raspberries. A mulch of chips, leaf mold or rotten sawdust is excellent. The best soil for grapes is sand loam, well underdrained and with a southern exposure. Grapes should be planted with roots well

spread to the south of vine and not more than six or eight inches deep at outer ends, and without manure of any kind; planting may be done in fall or spring and vines may be set eight or ten feet apart, with rows running north and south. Wood ashes is a good fertilizer for grapes, but well rotted yard manure may be applied after vines have been planted two or three years.

For those so happily situated financially as to be able to await from five to twelve years for returns the tree fruits are recommended. The cherry is an early and abundant bearer. The morello or sour varieties do best in this part of Indiana, and should be planted on sandy soil. Cherries may be planted fourteen or sixteen feet apart each way, and should have the soil well worked in about the roots and firmed by tamping.

The plum is a very early and prolific bearer, coming into fruiting at three to five years from planting. The native varieties are the hardiest and best adapted to this part of the State. Plums should have rich, black soil, and may be planted same as cherries.

The peach succeeds in nearly every State in the Union and Canada, and may, by proper selection of varieties and location of orchards, with proper care and culture, yield profitable returns even outside of the peach-growing districts. The peach should have light, sandy soil, of medium fertility, and may be planted twelve to sixteen feet apart each way.

The pear is a much neglected fruit and should be more largely planted. It succeeds here as a standard, fruiting at three to five years from planting, being a more prolific bearer than apples and selling at a better price. Clay land is best for pears, but sand loam will do if rich. Pears should be planted twenty or twenty-four feet apart each way.

Last, but not least, is the apple; in fact, it is the greatest fruit grown, the varieties numbering into the hundreds, commencing with their tempting blushes in the rosy month of June, running through the heated summer and autumn's blasts, and, by careful picking and storing, may roll down the long toboggan slide of icy winter, with its toothsome mellowness, into the lap of spring, rounding out the twelve months. No farmer having suitable soil should fail to grow apples; no family should be without a generous supply. Apple orchards may be of two classes—the orchard for home use and the commercial orchard.

The former should have varieties running through the entire season and they should be those of excellent flavor combined with good keeping qualities. The commercial orchard should contain but few varieties, and should be such as bear handling well, good keepers, and of bright, attractive colors. Any kind of upland, either sand or clay, will do for apples, and may be planted anywhere from 16x16 to 40x40 feet. Close planting should be thinned by cutting out each alternate tree when they grow large enough to crowd each other.

FRUIT GROWING AND SPRAYING.

ELI B. HEMMER, HUNTINGBURG.

[Read before the Dubois County Farmers' Institute.]

There are many good excuses for a man to go into fruit growing, but few, if any, why he may not enter successfully upon such a vocation. Every worthy consideration appeals for the increase of the production of fruits; health and happiness of the masses would be promoted and good citizenship would be advanced. Fruit growing appeals to us not only from the standpoint of individual profit and prosperity, but on account of the happiness of the people and the true greatness of our country. More fruit means better men and women. The products of trees and vines better the character of him who tends them as well as of him who eats the fruits. More fruit and less meat would usher in a higher civilization. Divine wisdom has never erred; when it said that to tend the vine and the tree and to eat the fruits thereof is man's proper estate on this earth and is most conducive to his happiness and well-being, it was right, and to-day, as it was then, fruit growing is one of the noblest of the vocations of men.

Now, whether fruit raising is entered upon for pleasure, profit or health, a few things must be closely observed if success is desired. Much depends upon the proper selection of fruits. Only such varieties as are hardy and known to thrive in the vicinity where they are to be planted, should be chosen. Trees and plants should never be transferred from a northern to a southern latitude, or vice versa, as failure is almost sure to follow. They must invariably be secured from nurseries that put stock into the market that is free from any disease germs. Again, since some trees produce imperfect flowers with nonperfect pistils, hence they are incapable of self-pollinization, it is best to secure several varieties and plant them alternately, thus permitting cross fertilization.

Let it be remembered that even if proper varieties have been purchased and they are well planted, this does not insure success. How often may not failure to produce a good crop of fruit be traced to improper care and tending of the trees and plants. Many things are here to be considered. The fruit grower should at all times strive to keep his trees in a healthful condition for there can be no healthy fruit unless the trees and plants are free from disease. No grass or weeds should grow in the orchard, for these furnish homes for insect pests as well as use up the moisture and nourishment which the trees stand in need of. The soil should be stirred frequently with some implement that will not destroy the roots. A good

plan is to turn the hogs into the orchard about once a week to have all fallen and decaying fruit cleared away to prevent the hatching of insect pests.

Trees, to do well, must be properly pruned. No one thing is so generally neglected and so little understood as a systematic pruning of fruit trees. We see many fruit growers who let their trees grow year after year without a single application of the pruning knife, until they have reached a large growth. He then takes the saw and ax and cuts away recklessly until he has a sickly and unbalanced tree, quite unfit to produce fruit. Every tree should be carefully pruned each year. Such limbs as intersect others or grow inwardly must be taken out, and it should be the aim to develop a well-balanced tree with the top as near to the ground as practicable. Fruit is much more easily gathered from a low dwarf than from a tall tree, and the top shades the trunk against the burning rays of the sun, thus prolonging the life of the tree. A round, symmetrical top, one low to the ground, well-aired and exposed to proper sunlight, should be our constant watchword in growing a young orchard.

There was a time in this country when to get an abundance of good fruit was but to plant trees and Providence would do the rest, but this time is forever past. It is a sad fact, indeed, that we see so many orchards in the southern part of the State where scarcely an apple can be found. Trees are apparently well tended and pruned, but there is a general scarcity of fruit. This is due to the ravages of insect pests. Following the destruction of our native forests, these insects come more and more to fall back on the fruit trees for a livelihood. From year to year they multiply in numbers, and fruit growers suffer the consequences. All the fruits are wormy, and not a single shapely and well-flavored apple or peach is to be had. Various fungus diseases also attack our fruit crop and work much harm. We have now reached that state of affairs that to be a successful fruit grower we must swear eternal warfare on all insect pests and fungus diseases, for that is the price of the successful fruit grower. We see the insect pests going forward with their destructive work from Maine to California, impairing the quality, lessening the quantity and destroying countless numbers of trees and vines. Their ravages are reinforced by the presence of scale, scab, blight and fungi, and we behold the brightest hopes of the fruit grower are shattered. It has been estimated that one hundred million dollars worth of fruit is annually destroyed by the united efforts of insect pests, blight, fungus diseases, scale, scab and yellows, in the United States alone. In some parts of this country these ravages are completely controlled by the proper use of the sprayer. Though not yet acknowledged by many, I believe that the sprayer is as indispensable to the Indiana fruit grower as is the plow to the farmer. The cost of a good spraying outfit is very small, and, with a few dollars additional each year for fungicides and insecticides a large orchard may be kept practically free from the ravages of these insect

pests. We have used a spraying outfit for one season on all our fruits with excellent results. Three applications were made, using only the two insecticides, Paris-green and London-purple. Scarcely a wormy fruit was to be found and in almost every case there was a remarkable increase in size, weight and quality of the fruit. With a few more years of experience we hope to entirely control the insect pests, and fruit growing will again be a pleasure, and a good profit can be derived.

SMALL FRUIT CULTURE.

D. A. M'DOWELL, BUNKER HILL.

[Read before the Miami County Farmers' Institute.]

Small fruits include strawberries, raspberries, blackberries, currants, gooseberries and grapes. These fruits may be small in size, but in value they are not small.

So well is the value of fruit now understood that no household is fully furnished without a good supply of fruits of different kinds. Thirty years ago a few berries for pies once in a while in berry season was all that was thought of. Now it is quite different. Each family thinks the year's provisions incomplete without arrangements being made for the supply of fruits in season fresh, and all through the year in the canned and dried states.

This fruit supply in best families is not simply a matter of taste, yet it is very good taste and suits the taste very well. But it is more than that: it is a matter of necessity in order to preserve the nest of health. "More fruits and less meats" is now being accepted as the best means to lengthen life and shorten doctor bills. Small fruits are never better than when fresh. Many people do not know what first-class berries are, because they have never used anything but shipped stuff. The only way to have good fruits and to have them fresh and at their best is to raise them yourself. Besides, it is cheaper than to buy them. Every residence, whether in town or country, should have its supply of home-grown fruits. Many persons think that these fruits are hard to produce. Like everything in life worth having, they demand attention. "No excellence without great labor" applies to culture of fruits. The soil of Miami County will produce a generous supply of fine fruits if we but give our Hoosier dirt a fair show. In order to have a good crop of anything it is necessary to have the soil well drained and well fertilized. Ground that produces good garden truck will produce any of our small fruits.

In putting out a patch of small fruits the higher grounds should be chosen in order to avoid the effects of late frosts, as the small fruits blossom early; that is to say, avoid the lower grounds as the site for your small fruit orchard. In laying off your grounds make your rows long,

as your plants will be more easily cultivated in this form. In putting out strawberries the rows should be three and one-half to four feet apart. Plants should be set about eighteen inches apart in the rows. Set as early in the year as you can secure plants and get the ground in good working order. Never set plants or trees in mud; they will not do well. Cultivate your strawberries as you would your cabbage. Let the sunners run, but have them keep in the row. You thus form the matted row. When winter comes on and the ground is frozen cover your plants with some light material such as clean straw, stable litter, bean vines, corn-stalks—anything that will protect the plants and not seed your ground with weeds or grasses. In springtime remove covering and cultivate till fruit sets and then stop; let the sunshine and showers do the rest. If you follow these directions you will have finer berries than you can buy in the stores.

Varieties are counted by the score. There are none more productive than the tried sorts, such as Crescent, Bubach, Haverland, Cumberland and Champion. Pistillate varieties should be grown near the staminate. A strawberry bed will produce but one best crop and will rapidly lose its productiveness. To remedy this defect new beds should be set at least once in two years.

Raspberries.—There are two classes of this valuable berry, the suckering and the tip varieties. The tip, or black, varieties are the only ones with which I have had any experience. The plants or tips should be set early in the year; the earlier the better.

The rows should not be nearer than seven feet. Plants should not be closer in the rows than three and one-half or four feet. Plants should be cultivated up to the middle of August. When the young cane the first year is one foot high the top should be pinched out. This will cause laterals or limbs to put out. In laying the patch by it is a good plan to sow oats in the ground. This will keep weeds down and forms a very nice winter mulch. After the leaves fall the trimming should be done. The branches should be cut back to one foot or nine inches. Plants should be cultivated the second year as first. The canes putting up the second summer should be pinched off at two feet high and laid by as first year. The cultivation the third year should begin early and cease when fruit sets. The third year there will be a full crop. When fruit is gathered the old wood should be cut out and ground cultivated again. Care must be taken not to cultivate deep next to plants, as the roots are near the surface. If this is repeated each year a raspberry plantation will last several years. Among the varieties, Early, Tyler and Souhegan are good; Gregg and Nemeha for late. The Nemeha is a finer fruit than the Gregg and the canes are more stocky and are hardier, the best main crop raspberry I have seen.

Blackberries.—The blackberry, like the raspberry, requires the third summer's cultivation before the full crop is reached. The culture is much

the same. Blackberries take a little more room than raspberries. Rows ought to be from seven to ten feet apart and plants four feet apart in the row. There is one mistake often made in setting blackberry plants—the cane or stalk is not cut off. The cane does no good and takes just so much as it grows from the new cane. Varieties: Snyder, Taylor and Uncle Tom (or Erie).

Currants and Gooseberries.—These fruits require the same culture. The rows should be seven feet apart and plants not nearer than three and one-half feet. These can with safety be set in autumn. Plants should be two year, first-class. With the small difference in cost, everything considered, the two-year plants are the cheaper. Currants and gooseberries are helped by scattering ashes among them. The great drawback in the culture has been the currant worm. If the bushes are sprayed with a weak lime and Paris-green wash just after blooming the worms will not do much harm. For the most of the bushes one application is sufficient. There is no danger in using this poison, as the first shower washes it all away. The old wood should be cut out, as the fruit is found on the new wood. The best varieties of reds are Victoria, Cherry and Versailles. White Grape is a fine currant.

The best varieties of gooseberries should be tried. Downing with me has not been a good bearer; the Triumph is a very large, fine looking berry, but it is not a good grower and the quality of fruit not fine. The Red Jacket has the reputation of combining large size, productiveness, good quality, hardiness and antimildew traits all in one variety. It seems to be the coming berry.

Grapes.—The last of the small fruits is not the least. The grape has been in use ever since the days of Noah. It is a very desirable fruit and one the most easily acquired. The grape will stand more neglect and abuse than any other of our fruits and yet be a producer. It can be grown almost anywhere. No lot is so small and so crowded that you can not crowd in a few vines. A vine can be trained against on old shed, stable or outhouse, in fact, any building, and be a successful bearer. A vine well cared for will produce fruit a great many years. Vines should be set six to eight feet apart and if in rows these should be eight feet apart. Good, strong two-year plants set down deep and well cared for will begin to produce fruit the second year. The best trellis for the grape is made of plain galvanized wires stretched upon posts. There is much in the trimming of the vines. This should be done in the early part of winter. I have found it most convenient to do this before the holidays, and am sure the crop is equally as good if not better than when trimmed in early spring. Two to three buds of each branch of the last year's growth is all that should be allowed to remain. This plan makes the vines look rather bare, but the results in fruitage are good, and that is the purpose of the vines. As to varieties, there is none that in a general way exceeds the Concord. Moore's Early is the best early grape. It is from ten days to

two weeks earlier than the Concord and of fine quality and hardy, a good bearer and thrifty grower. The Pocklington is the best white grape, the Delaware the finest red grape. I have twenty-five varieties growing upon my lot and have fruited more than half that number, and the varieties named are ahead.

Anybody who will give even a little care to the vines can have plenty of grapes. There is no fruit of more dietetic value than the grape. The juice of the well-ripened grape corresponds more nearly to blood in its chemical makeup than anything else.

You ask, Will it pay me to spend time with these berries? If you ask for pleasant labor I know of nothing that is more enjoyable than the production of fine fruits; fruits are as beautiful as flowers. Are you desirous of raising something that is useful in the family, something that is really enjoyable and at the same time conducive to good health and long life? Then raise small fruits. You can use them every day in the year; use them fresh from your plants, use them canned, use them dried. Whoever tires of good fruits in any of these forms? Do you desire to have something that will sell readily? What sells better than the luscious strawberry? Hundreds of busels of berries can be produced from a single acre. What if they do sell at 5 to 6 cents per quart; dried raspberries sell in the grocery at 35 cents per pound. There is more money in small fruit to the acre than almost anything else you can put on your ground. You ask, How can I get my start of plants and get them true to name—get what I buy? This is easily done. The way not to do it is to hear the professional liar. The man who sells sweet gooseberries, strawberry trees, currants that worms will not eat; blackberries that will not sprout, strawberries that will not run, grapes that are seedless and apples that are one-half sweet and the other half sour; the man who tells you he has a single sap tree and all others are not worth buying. The way to get what you want and what you buy is to deal with a square man—a man who is truthful in a trade as well as at church and Sunday-school. For twelve years I have dealt with a firm that sells nothing it can not furnish; that labels everything true to name, and never substitutes unless asked to do so; have found all I bought of them to be just as represented. It pays to try new varieties, but it also pays to stay with the tried varieties till you know of something better. Raise small fruit and plenty of it, for it pays, pays big, pays in enjoyment, pays in better health and lengthened life, pays in ready cash if you choose to sell it. But you will learn raising and marketing are two different tasks. It is easier to succeed in the first than in the second. You say this fruit takes care; so it does. So does everything else in life worth having. It takes care to have good horses, hogs and cattle; care to have good corn, good fences. It even takes care to bring up children, yet they are to be found in almost every well-regulated family. If you raise your own small fruits you will be the gainer in many ways. Your homes are not complete without a good small-fruit garden.

PROFIT IN GROWING BEETS.

L. A. STOCKWELL, CLOVERDALE.

[Premium Paper in Illinois Sugar Refining Company's Contest.]

The possibilities of beet production once fully understood, there will be no trouble to get them grown. Planted in rows fourteen inches apart, then thinned to nine inches in the row, an acre averaging twenty ounces will yield thirty-one tons, worth at four dollars a ton, one hundred and twenty-four dollars. Now let us keep our minds upon that possible one hundred and twenty-four dollars and see how closely we can come to it with our acre remembering that what can be done with one acre can be done with two or twenty or two hundred with this difference, that the larger the area planted the cheaper they can be grown per acre and per ton. Let it be understood that it is not profitable to use poor land. If the land is poor it can be made rich and at the same time produce profitable crops by the following method. On well-drained land suitable for corn, thoroughly prepare the land and sow to wheat. Top dress this wheat after sowing with twenty loads of good well-rotted stable manure (I use a manure spreader). In the spring, as soon as dry enough, harrow the wheat with a sharp-toothed harrow, then sow twelve pounds of medium red clover to the acre and harrow it in. This will insure a splendid stand of clover. The second year mow the clover for hay, then immediately top dress with a good coating of well-rotted stable manure. This induces a rank and vigorous growth of second-crop clover. Do not cut this crop, but turn it under ten inches deep in the fall. In doing this use a plow with a mold board so shaped as to pulverize and break up the soil particles as much as possible. The narrower the better, so it will turn the soil.

In February or early March go into your stables and with forks pile the manure up in conical piles six feet high. Watch it, and when thoroughly heated move it over a few feet. This handling will reduce its bulk about half. When hot again move again. This again very materially reduces its bulk and reduces it to such a state as to be handled with a scoop shovel.

Now, just as soon as dry enough, scatter this manure at the rate of ten loads to the acre over your fall-plowed field. Now with a disk harrow disk up the ground six inches deep. Follow with a sharp-toothed harrow to break clods, and mix the manure, then drag. Your field now looks like a good seed bed, but it is not.

Now take your two-horse cultivators, set them to run six inches deep and go over your field both ways. This will bring up lots of clods. Fol-

low immediately with the roller and pack well, in other words, make the top six inches of your soil fit for onion seed.

Now, being governed by the weather, harrow your field shallow with a sharp-toothed harrow often enough to kill the weeds that are just sprouting. Just before ready to plant sow broadcast eight hundred pounds of phosphate to the acre and harrow in at the last harrowing.

When the conditions are right (the seasons vary), along early in May or as early as possible, drill twenty-five pounds of good seed (testing 95 per cent.) to the acre in rows fourteen inches apart. Drill not over three-fourths inches deep with a press-wheel drill so as to insure germination. Earlier and shallower planting don't pay. Don't plant till the conditions are right.

Commence cultivating as soon as the beets come up with a cultivator, using flat shovels. (Small mules are better than horses on account of having such small feet.) Get as close to the rows as possible, then follow with hoes, being careful to loosen the soil about two inches deep.

When the beets show four leaves have a full force ready and with sharp six-inch hoes and a file go in and chop out the rows, leaving the bunches about two inches long. As soon as bunched go through and pull out every weed and all the beets but the best one in each bunch, being careful to gently push the dirt around each beet. You can well afford to hire men to do this, as they will destroy fewer plants by dragging them out. As soon as thinned with a seven-inch hoe give them a careful hoeing, so as to loosen and aerate the ground fully three inches deep. Each cultivation by mule power should be a little farther away, and a little deeper, till time to lay them by, being careful not to injure or loosen the beets. The same is true of the hoeing. As the cultivation naturally leaves the ground a little uneven it should immediately be leveled down again when being hoed, so as to conserve all the moisture possible, especially if a dry season. Right here I wish to say that there can be no iron-clad rules laid down. We must use good common sense and be governed by the weather. With proper and timely cultivation it is possible on rich, well-drained, well-prepared land, to raise a good crop in a dry season.

The dryer the season the oftener they should be cultivated, it being understood that culture means something besides weed killing, and that to get a maximum yield we must give thorough culture, which ordinarily will require six hoeings.

RECAPITULATION.

We commenced our preparations by heavily manuring and thoroughly preparing a seed bed for wheat. Every bit of which was paid for by the increased yield of wheat (as I could prove by my books had I room), and the heavy crop of clover hay the next year.

Twenty-five pounds of seed at an extra cost of 75 cents for the extra five pounds insured us a good stand without which a big yield could not be had. The heavy seeding was also of use in case of an early rain forming a crust before the seed came up, a thing not probable though on land so prepared. The preparing and applying of the well-rotted, scoop-handled manure and the clover roots and second-crop clover turned down made a good supply of nitrogen and potash, and the phosphate the phosphoric acid needed to make a large growth. The thorough tillage did the rest.

Summed up the account stands as follows:

Plowing, per acre.....	\$1 00
Preparing ground.....	5 00
Planting	50
25 pounds seed, at 15 cents.....	3 75
Bunching and thinning.....	4 50
Five hoeings and pulling weeds.....	10 00
Five cultivatings	1 00
Rent of land.....	6 00
800 pounds of phosphate, at .8 cents.....	6 40
Ten loads fine manure.....	10 00
<hr/>	
Cost per acre.....	\$48 15
Thirty tons, at \$4.....	120 00
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Profit	\$71 85

Suppose you only grow twenty tons, and deduct \$7 for lifting, topping and hauling the average distance, you still have left \$25 an acre, which capitalized at 6 per cent. would equal over \$400 an acre.

The reader will notice that while the average grower spends right around \$1.50 an acre in fitting his land for planting, I have allowed \$5 for that part of the work. To grow maximum crops the plant food must be made available and to make it so the soil must be finely comminuted. A beet seed is very small and the young beet roots are very delicate and tender. Air spaces among clods the size of wheat grains are fatal to its best development. Right at the start is the critical time. Anything undone then is past repair. But to get back to the profits again:

There is another one not usually credited to the beet crop and that is this: It has left the land in the best possible condition for the growing of other crops. Lack of space allows me to speak of but one and that is timothy.

This crop, if properly put in and sowed alone as soon as the beets are ripe will make a good crop the next year and by a little attention afterward will grow four or five tons of hay, or twenty-five bushels of seed to the acre, not once but for several years.

Not one farmer in a thousand knows the possibilities of timothy or timothy seed production on land prepared and cultivated as above described. I have raised on land so prepared \$30 worth of seed and \$20 worth of hay per acre. Hay that was eaten by horses in preference to early-cut hay.

The thorough manuring and cultivating given the beets has more than doubled the value of land as a producer of timothy hay and seed and really should not be charged up to the beet crop at all.

Taking this view of the case, growing sugar beets is the key to intensive and profitable farming and is the best and surest business on earth.

HORTICULTURE.

W. W. PALMER, RISING SUN.

[Read before the Ohio County Farmers' Institute.]

A few years ago I was called upon to take a part in a farmers' institute which was then a new thing. The subject assigned me was "Horticulture," and, as usual, I blundered over my part, as well as I knew. Whether it was the remarks I made or the remarks of others that followed in the discussion I do not know, but something stirred up an interest in the matter. A committee was selected to draft a constitution, etc., and a time set to meet and organize, which task was accomplished in fair style. We met regularly, and, although our meetings were not attended by such numbers as we thought ought to be interested, yet I think we were benefited by coming together and spending a few hours quietly chatting over our successes and failures, our methods and experiments in the orchard and on the farm. Our president was a fruit man as well as a general farmer, like the balance of us in regard to occupation. Such as were not active farmers were dependent on the farm for their subsistence. All farmers are not inclined to follow in the rut and do just as their ancestors did. There was a time when farmers of this country were not engaged in special crops, but as the years have rolled on men have cast the rock from the mill sack and balanced the grain without the added weight. If we have a tendency to engage in horticultural pursuits, it is necessary to gain all the information in reach to make a success of the undertaking. Every man ought to have a hobby, but not to ride up to the front on dress parade. We must steer our own boat and keep clear of fads, never suffering ourselves to be made a machine, to be turned by a crank. While such men as Downing, Wilder, Warder, Ragan and others were enthusiasts in everything relating to fruits and flowers, they-

will ever be remembered as the leaders of their generation, in their calling. The memories of these men are often mingled in my thoughts as I go about my daily avocation. The name of Reuben Ragan is especially dear to all who knew him either in his home life or by his history. He emigrated from Kentucky to Putnam County, Ind., a single man, on horseback, traveling 200 miles, a large portion of the way through a wilderness along a mere path, beset by wild beasts and wild Indians, with his ax and his rifle; with a few articles of clothing, seeds and grafts, all in his saddle bags except his gun. His first task was to clear a spot in which to plant the apple, peach and cherry and also his vegetables and flowers. He built him a cabin and kept bachelor's hall several years, spending his summers improving his home, returning in the winter to Kentucky to visit his friends and gather seeds and grafts. In three years he was able to furnish Putnam and other adjoining counties with some of the best varieties to be obtained at that time. He was a close observer, and could recognize almost any variety of trees as readily as he could the distinctive features of men. He foretold the destruction of his pear orchard of 200 trees a year before the leaves showed any signs to the common observer. Charles Downing indorsed his theory, and H. W. Beecher, then living in Indiana, pronounced him the best horticulturist in America. He lived and died on his farm, surrounded by his own handiwork. His greatest delight seemed to be in wandering among his fruit and flowers. He often remarked that this is a most pleasant world, but it is just as men make it. Not more than an hour before his departure he was presented with a flower. He exclaimed, "Oh, how beautiful!" These were his last words on earth. Would it not be profitable for us to follow the example of such men, and gather around us the things that are good and beautiful and make the most of life while it is ours? The younger generation is taking up the mantle that time has shifted from the shoulders of these aged and worthy men and will doubtless bear aloft the standard which they unflinchingly bore until death relaxed the iron muscles and stilled the throbbing heart within the quiet sleeper's breast. There is always room at the top in every profession, and it seems to me there is no other employment that yields more satisfaction than the hours we spend in the care of the orchard and garden. The beautiful flowers and fruit seem to elevate the mind from the bountiful blessings of earth to the Great Giver of all we enjoy. How many of us today feel like criticising Father Adam for the disobedience that causes us to earn by the sweat of the brow all that we eat during the days of our present life, and finally to lie down in the dust of the grave. Adam was not without his employment, for, when God placed him in the garden he was commanded to dress and to keep it. God never created a man to be sloven nor idle, and I think the command extends to every son of Adam that has a farm, an orchard, or a garden to dress it and keep it. As I pass along the road and look over the fine farms, gardens and orchards that belong to men who

are financially able to set a good example to the surrounding country I often think of the exclamation found in Holy Writ, "What is man that thou art mindful of him?" Scores of men are idle for the want of encouragement and employment that ought to be willing to tackle anything that would bring comfort and plenty for themselves and families. Indiana lies in a line of States reaching from the Atlantic to the Pacific that is not equaled in the production of fruit adapted to the temperate zone on the face of the earth. But the day has come when men must use their brain as well as hands in raising fruit. Brain seems to count more than muscle, but they must work in concert to accomplish much in this generation. How many orchards can we find around us of well-selected varieties, properly cultivated and pruned and defended from destructive insects? With a suitable soil and in reach of a good market, the growing of fruit is a remunerative employment, but the success attained will depend on the practical knowledge and skill of the man. The varieties must be suitable for the soil, climate and market for which they are raised. He must give his trees proper care and cultivation. Thousands of trees perish every year for want of care. Buying the right kinds of trees is the starting point. A mistake here can never be rectified. Traveling agents are not all angels, nor all the other sort, yet I would rather buy from reliable nurserymen. A nurseryman's reputation is at stake, and he will generally treat a customer with some consideration, while the other man you may never see again. It was the father of a part of this tribe that attended the first pomological meeting we read of. We read of him again in the Book of Job. When the sons of God came together he was in the midst of them. When asked, "Whence comest thou?" he answered, "From wandering up and down and walking to and fro on the face of the earth." He did not state that he was in the tree business, but his habits would indicate that he was following his old profession. The frost of many years is scattered o'er our temples and the most of our youthful comrades are sleeping, yet it is a pleasure to plant a tree. The young are growing up around us, and I am glad to know that it is in my power to place blessings within their reach that I in youth did not possess. Let us plant while we may and set an example that the younger generation may gladly and honorably follow. I would regret to think that I had nearly lived out my three score years and ten without leaving landmarks that others could safely follow.

PASTURES.

E. A. SWOPE, EVANSVILLE.

[Read before the Vanderburgh County Farmers' Institute.]

Mr. Chairman, Ladies, Gentlemen and Brother Farmers—You no doubt have ascertained from the program that I have been assigned the subject, "Pastures." It is not a very long nor high-sounding name for a paper, but one that I feel I will not be able to handle properly. However, I will endeavor to give you my experience and observations for what they are worth during the short time I have been contending with pastures. This is something that makes the most of us farmers who have any amount of stock on hand, worry, plan and maneuver considerably to keep from feeding so much dry feed; for, when pastures are short, and dry feeding is necessary, it begins to touch our pocketbooks by taking the profits we might have had, providing our pasture had been in the proper shape or we had the right kind at the proper time.

In taking up the different kinds of pastures, it is my intention to provide a pasture for stock from about the middle of March to the middle of November or 1st of December, and in discussing same will give the time of sowing quantity of seed per acre, and the time I expect to pasture same.

As we are approaching the end of the fall season, it would probably be better to start with the fall pasture—rye—as that is also used first in the spring. In plowing for rye we start about the last of July or first part of August, according to the season, if it is not too dry. This year I finished plowing the 16th of August, and by the middle of September the rye was sown. I generally put a bushel and one peck to the acre, but this year I sowed one and a half bushels per acre, mixing wheat and rye together, taking four pecks of rye and two pecks of wheat. Now, if the season is favorable, as it has been this fall, you have considerable pasture and can turn on it about first of November, and can pasture this off and on all winter, providing you find the time when the ground is not too wet, and from the middle of March or first of April you can pasture the rye almost continuously, but it is best to have a blue-grass or clover field to change off with.

In pasturing rye, I find you get more pasture off of the same ground by keeping it down pretty close, and not letting it get up tall, for when it gets that far along, it gets tough and the stock does not relish it, and after it has been pastured for a while you find you have nothing but dry stems left, and they begin to head out and your pasture is done.

This takes us up to about the middle or last of May. Now, the next is our clover to start on from about the first of May and continue on until the first or middle of July, when it is time to break it for wheat. In pasturing clover, a great many of us turn stock upon it too soon in the spring. In this respect it is different from rye, for it is best to let it get up pretty well. In parts of Kentucky they let their clover get a good start, and then turn their stock in and keep it there until the hay is cut and hauled to the barn. I tried that plan two years ago and it worked all right, as well for the barn as it did for the stock.

In saving clover seed I endeavor to sow, on wheat ground, as near the middle of February as possible, and I like a snow the best for a seed bed if I can get it. I have never failed getting a stand at this time of year, but have sowed in March and first of April and failed repeatedly. I use a bushel of seed to six acres. I think it is profitable to add timothy also in the same proportion. Mix your seed and sow both at the same time.

Now, the next step will be what we will style the permanent pasture. This is to be ready for the stock by the first or middle of May, sometimes a little sooner, after you have a good strong turf formed, and you can continue on this pasture all summer and until late in the fall, but it is best to have other pastures for a change, for then your permanent pasture is not picked too short. In starting this pasture, I took a ten-acre tract that I cleared and raised three crops of corn from. The third crop was cut and hauled off, and it was my intention to put in a crop of wheat or rye by sowing broadcast, but the fall was an extra wet one and I did not accomplish my purpose. But in the following February I sowed across the top of the corn ridges one bushel of timothy, one bushel of clover, three bushels recleaned redtop and seven bushels Kentucky blue grass, or a little over thirty-eight quarts of seed to the acre. I mixed the seed and sowed all together. The first summer this pasture must not be picked very close nor the stock kept upon it too long at a time, but the second summer, or a year from the time it was sown, you can begin pasturing about the first of May. This will give the blue grass an opportunity to seed itself. I found an article in last week's Ohio Farmer on the question, "How to obtain a permanent pasture." That puts it a little stronger than I do. The editor says: "Plow the ground in July, cultivate thoroughly, and seed early in September, using one bushel per acre of rye, eight quarts per acre of timothy, twenty quarts per acre of recleaned blue grass and twenty quarts of redtop; in the spring sow six quarts of common red clover seed; in May or June mow the rye and let it lay; mow again in September and let it lay as a mulch. This seems a great expense and a very heavy seeding, but it will pay to get a strong turf as soon as possible to prevent wash and make a strong pasture." This makes fifty-four quarts of seed per acre, or about sixteen quarts more than I used. The ground this seeding was to be applied to was a gravelly, red clay soil, and of necessity needed more seed per acre than richer ground; but for

my part I claim it to be false economy to be sparing with seed, especially for pastures and meadow land.

To derive the benefit of all the pasture that our farms afford, we must look to our fences, something that most of us farmers have sadly neglected in the last few years.

I venture the assertion that there is enough pasture wasted or not utilized on some of our farms to grow enough meat in the shape of beef and pork to run the average family the year around.

Later on I will give you the figures, found by different experiments, showing the value of pasture land. Before we leave the subject, however, let me remind you that the pasture mostly wasted or not utilized is our wheat stubble fields and our meadows. A nice drove of shoats and a few beef cattle can be put in fair condition from the stuff that usually no benefit is derived from. My opinion in regard to meadows is that if we would pasture them down, when the aftermath has made a good start, it would kill out the biggest portion of weeds and wild stuff and the meadow would probably last longer than one, two or three cuttings. The next we will take up is cow peas for pasture. I can not give you much from actual experience, as I have only raised one crop, but I will endeavor to tell you the way it ought to be done. According to our method of pasturing, our rye pasture has been picked short the first of May and is now ready to be plowed. This, properly done, must be from six to eight inches in depth. The ground should be loose, mellow and warm, neither wet nor cold.

If your ground is in fair condition after plowing, you can sow the peas broadcast and harrow them in, as I did some this season, covering them from two to three inches. I found that they would grow if not covered at all, providing the ground was loose. The quantity of seed used per acre varies from one peck to two bushels. For pasture I used one bushel and a half, and from twelve to fourteen weeks from the time they are sown they are ready to be pastured, or when the lower leaves and pods begin to turn yellow. If you desire to cut for hay before pasturing you may do so, and, if the weather is favorable, two weeks after they have been mowed there will be sufficient growth to furnish a good pasture; after they have picked down, keep the stock off for a while and give the peas another chance to shoot out. This may be repeated three or four times.

Another way I found very satisfactory was to sow the peas broadcast in the corn before it was plowed the last time, and then lay by your corn with the shovel-plow. An acre will pasture fifteen or twenty hogs for several weeks and put them in good condition to be topped off with corn.

Some say that sorghum makes a good pasture and will last until frost kills it, but I have had no experience with it. I expect to try a patch next year.

Now, with a good pasture at our disposal, let us see what the benefits will be in pounds, dollars and cents.

Professor Morrow, of Illinois Experiment Station, reports the gain of steers maintained wholly upon pasture during the season from May 1st to November 1st of sixteen head of one-year-olds as 285 pounds for the least, to 440 pounds for the greatest gain; and the gain of nineteen head of two-year-olds was from 384 pounds to 466 pounds per head during the same season.

An interesting phase of the same question is the amount of gain made by steers from an acre of pasture land. In different trials the professor obtained an average of about 200 pounds of increase, live weight, per acre, from steers wholly on pasture. This average shows that when beef brings a reasonable price, such pastures have a value of something like \$100 per acre.

THE HESSIAN FLY.

JOSEPH M'MAHAN.

[Read before the Union County Farmers' Institute]

Throughout the State of Indiana the wheat crop of 1900 was almost an entire failure; and we are asking: "Is it worth while to try to grow wheat?" This depends upon whether the causes of the failure are beyond our control. Although the winter, no doubt, had something to do with the failure of the wheat crop of last year, the Hessian fly was the real cause.

For a minute let us look at the history of the Hessian fly. While its first carefully written description was by Thomas Say, in 1817, it had been for many years recognized as a pest in wheat and had received in this country the popular name of Hessian fly, in the belief that it had been introduced by the Hessian soldiers, in the vicinity of New York, during the Revolutionary War. Although there is no absolute proof of its introduction at that particular time and place, the evidence all goes to show that the insect was introduced from Europe at very nearly that period, and it evidently must have been brought in the straw used for packing.

Its original home is not exactly known, but the fact that it is confined so strictly to wheat, rye and barley would lead us to the belief that it has been associated with these as food plants from prehistoric times, and that its source was in western Asia, which is the home of these plants.

The adult or full-grown fly is a small gnat-like, dark-colored insect, which has two sixteen to twenty jointed antennae or feelers, six legs, two

light, gauzy wings and two minute projections just back of the wings which might be called false wings. The female is from one-tenth to one-eighth of an inch long, and when full of eggs resembles a small mosquito moderately full of blood. The male is smaller, more slender, and a shade darker than the female. The life time of the full-grown fly is short, lasting only the few days necessary to the processes of mating and laying of eggs. If the weather is unfavorable so that it is delayed in these it may live several days; but if they are accomplished promptly, its life may be measured by hours rather than days. Let us remember that in this stage of its life that it does no harm to the wheat. It lays its eggs (from one to thirty in number) on the upper side of the blades of the plant. The egg is only about one-fiftieth of an inch long. In four days, more or less, according to the weather, the eggs hatch out into larvae or grubs. These larvae then move down the blades and get in between the blades and the stalks. Having reached this position, the larvae change their form slightly. While in this form they can not move. It is during this period that they make their growth and do the damage, by absorbing the life from the plant. At the end of this stage, which lasts on an average about twenty days, the larvae contracts and the outer skin forms a puparium, or shell, in which form it is commonly known as the "flax seed." In this form the fly passes through the resting seasons. The length of the resting season depends wholly upon the weather. The full-grown flies come from these "flax seeds" and stay about the fields until the eggs have been laid. It has been noticed that, although they can fly well, they do not go far from the field in which they are hatched.

Under different conditions the fly is capable of producing from one to six broods each year (Marchal). In this climate two broods develop each year. Flies which have passed through the winter as "flax seed" appear early in the spring and lay their eggs on the wheat. Most of the larvae which hatch from these eggs become "flax seeds" a little before harvest. When the wheat is cut the majority of these are in the stubble and come out in time to lay their eggs on the fall wheat. The effects on the wheat differ with the season, and with the age of the plant at the time of attack. In the fall the eggs are laid upon the early appearing leaves and the passage of the larvae down the sheath or stalk carries them down below the surface of the ground, often very near the root itself. The attacked plant turns a darker green, followed later by a brownish and then a yellowish color. If the plant is attacked early, and fails to tiller or stool, the result is death of the whole plant; if tillers have already formed, the larvae may enter but one or part of them, and the others, which do not come above the ground until the fly has disappeared, may develop into healthy stocks and furnish the basis for a crop. For this reason, if for no other, commercial fertilizers should be used. The fertilizer not only causes the throwing out of more tillers or shoots, but enables the late shoots to secure sufficient strength to carry them through the winter. The attack in

springs is made usually after the stalks are well formed, the eggs are laid on the lower leaves, and as a rule the larvae are found just above the first joint. Their presence here so weakens the stalk that it falls over and we say that it is straw fallen. We can all see that the position of the larvae must have a great deal to do with our methods of control.

All authorities agree in the conclusion that were it not for the natural enemies of the Hessian fly, the parasites which feed upon them, wheat growing would be next to impossible. According to Marchal, there are seven varieties of insects which feed upon the larvae of the fly and destroy probably nine-tenths of them. Most of these deposit their eggs either in the egg or with very young larvae of the fly. In some cases where the punctures by the parasite have been very numerous the larvae attacked die before they are completely developed. In such cases the parasites also perish. More often, however, the larvae of the fly continue to feed and grow to the time of forming the "flax seeds." The "flax seeds" of the attacked larvae are smaller and paler than those of the normal larvae, sometimes even of minute size; generally flat, and always of irregular form. Although the parasites destroy such a large per cent. of the fly, they can not free us of the pest without our help. I feel certain the Hessian fly need no longer be a source of loss under a proper system of agriculture.

Let us first consider some of the remedies which we hear spoken of frequently but which seem to be of very little value.

Rolling the wheat with a heavy roller while the eggs are on the blades has been suggested, but this is without value unless the ground is perfectly level.

Pasturing with sheep, if practiced at the right time, will destroy a great many of the eggs; but, when we remember that the eggs usually hatch within four days after they are laid, and that the larvae soon after hatching make their way down to the surface of the ground or even below it, where the sheep can not reach them, we can easily see that there is little basis for favorable results by this method.

Mowing the wheat when from one and one-half to two feet in height was tried by Mr. Goodhue, but with small success.

There seems to be scarcely any reason to expect success from direct remedies, such as soot, lime, salt, etc. Aside from the expense and labor of their use, there is little reason to believe that they will accomplish as much as the more simple and less expensive methods. The same may be said with still greater force concerning all suggestions as to the treatment of seed wheat, since there is no connection between the seed wheat and the attack of the fly, although some claim that there are resistant varieties of wheat.

The following are some of the things which we can easily do and which if done will almost kill the fly. The most important of these is the time of sowing. The great resource against the fly is late sowing. According

to Webster the time for sowing in this part of the State is about the first of October. In our neighborhood last fall we held a meeting and nearly the entire community agreed to put off wheat sowing until after September 25th. This was probably a week or ten days too soon; however, the greater part of the wheat was not sown until after the first of October. As a result the damage done by the fall brood of fly was very slight. To be successful the sowing should be so late that the plants do not appear above ground until after the majority of the flies have come out and died. If the fall is hot and wet, should delay sowing; while if rainy the crop may be sown somewhat earlier.

If we would all burn all our stubble we should destroy a large percent. of the fly; but in Union County this is out of the question, because of the wheat being sown to clover. The past fall we sowed decoy strips of wheat in two fields and succeeded in destroying a great many of the larvae. Although not possible to entrap all the fall brood of larvae in this way, this combined with the late sowing will destroy the great majority of the fly. A decoy strip in this part of the State should be sown about the first of September first and destroyed within four weeks.

A rotation of crops is, also, a great help. If communities could adopt a uniform system of rotation of wheat crops with crops that are not capable of supporting the Hessian fly we should secure almost perfect immunity from the pest. This is practically accomplished throughout a large part of the State of Iowa, where wheat is grown as an occasional crop and the Hessian fly has been practically unknown since the early settlement of the State.

Now, with your permission, I will take a moment to summarize. The Hessian fly is a small, gnat-like, dark-colored, two-winged insect. It was introduced here from Europe over 100 years ago. In this county it appears in the fall generally throughout September, and in the spring in May. The effect on wheat, in the fall, is to prevent the plant from sending up tillers or shoots and makes it easy to kill in the winter. In the spring it weakens the stalk so that it falls over. The insect passes the winter in the "flax seed" stage, just above the roots of the plant. It passes the summer largely in the stubbles.

The best things to prevent the fly are: Late sowing, use of commercial fertilizers, burning of the stubble, sowing decoy strips of wheat, and rotation of crops.

The past year Union County grew less than 1,000 bushels of wheat, a shortage in the crop of something like 340,000 bushels, or more than one quarter million dollars. There are about 1,200 farms in the county, and this shortage meant an average deficiency of \$200 in the year's receipts. But it meant more than that on many farms. It meant \$200 borrowed money, the shadow of a mortgage, payments deferred, the straining of credit, improvements postponed, denial of luxuries, comforts, and sometimes even the necessities of life. But in no other way, probably, could we

have learned so well the lesson we have in wheat growing. The value combined action and a closer study of the conditions affecting the growth of this crop. I hardly think that farmers will ever be able to combine so successfully as men have in some of the other professions in fixing the price of our products, but there are some combines we must effect if we would secure the largest returns in crop growing. Union County has for years led the State in intelligent farming methods, and I believe will be one of the first to rid itself of the Hessian fly and in the future be, as it has been in the past, the most prosperous and most progressive farming community in the State.

IS THE PRODUCTION OF WINTER EGGS PROFITABLE?

THOMAS O. BLAIR, WESTFIELD.

[Read before the Hamilton County Farmers' Institute]

Since wealth lies chiefly within the man himself, the profitableness of any business is to a great extent a thing of the imagination. "Whether a thing is large or small, depends on the way you view it," as the mite said to the man at the other end of the microscope. What is profitable to one does not seem so to another, and there are kinds of profit as well as degrees—profits in dollars and profits in dignity. Most people prize the dollar for the dignity which it is supposed to have the power to purchase. As great a wealth of dignity may be acquired and expended in the poultry yard as in the White House, though this does not seem to be the view of a recent writer in a popular magazine, who exclaims: "Look at our Presidents! A man is suddenly called, perhaps out of some country town, to help shape the destinies of great nations. His antecedents may have been petty and commonplace; his father to-day may run a sawmill or raise poultry. But for four years this man stands on a level with kings and emperors, and controls seventy millions of people. And then, one day, the door of the White House is shut behind him and he goes back to the village, and if he, too, for the rest of his life saws pine boards or sells chickens, nobody cares."

Now, why should anybody care, especially the ex-President? Does not a President lie within walls wrought out by workmen equally honorable with himself? Does he not eat fowls and eggs produced by poultrymen equally honorable? Just why it should be more honorable to eat a thing than to produce the same thing for another to eat is a Gordian knot which can not be untied. Some shrewd Alexander will have to cut it.

Sawyer, farmer, poultryman, may stand on a level with kings and emperors, and here he does help to control the destinies of great nations. There was once a youth who kept his father's few sheep in the wilderness. He slew a lion and a bear in their defense, and gathered from the brook for his sling, smooth stones with which he slew a giant, and won a great victory for his people. This youth became a king indeed, and helped to shape the destinies of nations, being none the worse, but rather better for his rural training.

Oh, those false standards of the dignity of station! They made men mad in other days, and they do yet. But the false is vanishing before the true. The world is coming to realize that if the plow had not turned the furrow, the iron horse had never swept the curve. And we live in the dawn of the prophetic age, when war and commerce shall lay their trophies at the feet of agriculture. Now the most honorable thing for you to do is the thing which you can do most honorably.

Some will say, "What has all this to do with money profits in the production of winter eggs?" It has this to do: He who feels the dignity and importance of his calling will pursue it with delight unknown to him who does a thing simply because he must. He will love his work because it is honorable. Love begets enthusiasm and "enthusiasm lightens labor." This, then, is the true relation of dignity to dollars; it enables a man to do more work, and to do it more easily, with better results in dollars.

We will now further consider the dollars side of the question. "Is the production of winter eggs profitable?" The answer is, "Yes," or "No," according to conditions. As in every other line of business there are conditions of supply and demand, as well as conditions within the man himself and in his circumstances.

There was once a boy who read Longfellow and learned from the poet the things of which "lives of great men all remind us." The boy resolved to begin the new year living sublimely and leaving his "footprints on the sands of time" in tangible form by keeping a diary. So he bought a book, bound in morocco and gilt, and wrote:

"January 1.—Resolved to keep diary.

"January 2.—Got up; washed; went to bed.

"January 3.—Got up; washed; went to bed.

"January 7.—Can think of nothing to write to-day.

"January 18.—Got up; washed; went to bed.

"January 31.—Resolved to quit keeping diary."

This boy failed to make profitable the production of a diary from the same causes which lead others to fall short of the profitable production of winter eggs and other things. His aim was visionary; his patience was limited. And he did not realize that to succeed well in anything one must be constantly "thinking out his work, and working out his thought."

Be reasonable in your expectations. Whoever heard of a millionaire poultryman who made his millions from his poultry? Whoever heard of any one making a living from poultry without abundance of patience in following out the minutest details, not excluding from the grammar of his business such nouns as louse, rat, weasel, gapes, roup, cholera, chicken-thief; and not ignoring much work popularly supposed to be undignified? He must not count his chickens with assurance until they are hatched, reared, marketed and the money in his purse, nor his eggs until marketed and paid for. He must be content, in casting up his accounts, to see not the dime, the dollar nor the cent, but the mill, as his standard of value. Yet dust enough will make a mountain and mills make cents, dimes, dollars, with which to procure the necessities, comforts, luxuries, honors which dollars earned in any other way will buy.

But a man, reasonable in his aims, patient and painstaking in all his work, may not find winter eggs or other poultry products profitable to him, because he can employ his time more profitably. Such a farmer, of course, usually allows other members of the family to do such work, and if generous he will give those who do the work a chance to make it profitable for themselves. He will not follow the shaming example of Josiah Allen, who allowed his beloved Samantha to rise night after night in cold weather to feed an orphan colt by hand; and when the colt was sold at a good price, he generously shared the profits with Samantha to the amount of 10 cents.

Whoever heard of any one producing winter eggs, with or without profit, who did not by design or accident afford his fowls the conditions under which winter eggs can be produced? Michael K. Boyer, in his booklet, "A Living From Poultry," has this to say: "Years ago farmers thought it next to impossible for hens to lay in winter. 'Tis against nature,' they said. To-day the winter production of eggs and poultry is the mainstay of the business." Another writer says: "Winter is the very time when eggs are worth the most, when hens want to lay as much or more than they do at any other time, and when they are not allowed to do so by most poultry keepers. Folks think there is a great mystery about making hens lay in winter. There is none; anybody can do it; that is, the hens will lay if you let them." The writer then proceeds to exhibit his method, which is too lengthy for quotation here, and perhaps too elaborate for many of us to follow. You can find it all in "Profits for Poultry," published by the Orange Judd Company.

Whatever the degree of profit, farmers keep hens, and can not well get along without them. If kept at all, they must be kept over winter and housed and fed in some sort of fashion. Therefore, every winter egg produced is a source of profit. It beats nothing, to the extent of its market value. And every additional winter egg above the ordinary supply adds to the profit unless you pay extra for its production more than its

worth, which is not necessary, if you know how to manage. **Get literature and study it. Observe others and profit by their experience. Experiment judiciously for yourself.**

I keep a few hens and my method is very simple. Keep good stock, make them comfortable and happy at all seasons, and they will do their best. Last winter I carried eggs to town when some of my neighbors were not doing so and the weather was very cold. I fed the hens indoors; did not allow their combs to freeze, gave them meat scraps occasionally with their other food; left crushed oyster shells always before them, and fed whole corn once a day; at other times boiled oats or scalded bran and meal. I do not know what my profits were in dollars; accounts were kept but not summarized. Figures in a paper like this are apt to be delusive, for a man's profits in this business are the product of so many factors that each one must experiment and learn for himself what he can do.

The hen must have rest at some time of the year. Poultrymen who produce eggs for spring hatching do not want their hens to lay much in fall and winter, as this, they say, will prevent the fullest supply of eggs in the spring.

The demand for fresh winter eggs and consequently the price paid for them, is affected by the packing business; and the chemist has been at work trying to produce the egg in its essential qualities without the intervention of any feathered biped. But the packer has not succeeded in driving the winter hen to the wall, and there is no apparent danger to the market from eggs not laid by hens.

CARING FOR AND FEEDING STOCK.

JOHN DITMAN, FRANKLIN.

[Road before the (Greenwood) Johnson County Farmers' Institute.]

The subject given me to speak on is a very wide one. I do not think I will be able to get over all the ground; that is, give all the details in the care and management of each kind of stock.

In this changeable climate all kinds of stock should have shelter—something that will keep off the cold winds and rains. Good, warm quarters is a saving of feed. If without protection from the cold winter winds and storms, so much of the feed given to stock has to go toward keeping up the necessary heat of the body that ought to go toward making flesh and bone and fat. So every stock raiser can economize feed by providing good, comfortable quarters for his stock.

To manage and feed cattle to the best advantage is quite a problem; that is, to get the best possible gain out of the feed given them, you must

prepare a bountiful supply of all kinds of feed. Give stock cattle all the roughness they will clean up, with a little corn night and morning.

For feeding cattle, give all the broken corn they will clean up by the time the next feeding time comes, with all the fodder and hay they will eat, and feed them at regular hours.

Punctuality is very essential in the care of all kinds of stock. They know when their feeding time comes as well as you do, and if you are a little late they get restless, begin lowing, squealing, etc., which is against their thriving and doing well. Be regular, and always treat them kindly.

The profit in feeding cattle the last few years, with so small a margin, is very small at best, so you must be very careful and watchful that you manage them to the very best advantage.

To the cattlemen, stock cattle, also feeding cattle, have been too high a price to be profitable. The price of feeders has been too near the selling price when fattened. However, just at present the cost price is getting near what it ought to be, although number one good grades are too high yet. No doubt the raisers do not look at it in this way.

It is a question whether stock cattle can be raised cheaper than they can be bought at the age and size desired. In fact, I was told recently by a successful stock breeder and farmer of our county that, taking everything into consideration, the value of the cows and their keep was a little in excess of the value of the calves at yearlings. That, generally, is the age most people want their stock cattle.

I think every farmer ought to keep a few good cows for raising beef cattle, the number he can manage to good advantage. We should be careful and not overstock ourselves; that is a serious mistake.

Of what benefit are shelters to stock if compelled to lie down in manure six, eight or more inches deep? The air is bound to be impure, besides cattle look very untidy.

Bedding is a very essential point in taking care of cattle. Stock out on pasture in summer will not select a muddy place nor a filthy spot to lie on. Give them a clean place to lie on and they will certainly appreciate it. By bedding frequently you make more manure. That, you all know, is a very important item in the pursuit of farming; and, above all, after your stock have made it, take care of it with as little waste as possible.

Stock cattle weighing about 800 pounds, given all they will eat of good, well-cured fodder in dry weather and clover hay in rainy and wet weather, with a gallon of broken corn for each steer a day, in a dry lot, with access to good shelter, opened to the south where they can go at their pleasure, will grow and take on flesh all winter long and go out on pasture in fine shape for making a splendid gain during the summer. A mistake that is commonly made in the care of stock cattle is at the close of the grass season. We should not neglect giving them some fodder as soon as heavy frosts and light freezes come. Grass at that time of year is not quite sufficient alone. Therefore, give a little dry feed of some sort.

If your grass is good and you have plenty of it an abundant supply of good water is very important. They should have all they want and when they want it. Then, by the time your growing corn is ready to feed, you will have a nice bunch of cattle for feeding. If you do not want to feed them, sell to somebody who does want that kind of cattle.

In my estimation, fall is the best time of the year for feeding. Commence as soon as new corn is dry enough—say hard roasting ears. Feed on grass and you will get a fine gain at a very small expense. Then your cattle, if they have done well, will, as a general thing, be ready for market before the cold winter weather sets in.

It is a good thing we all don't want to handle the same class of cattle. If we did, some classes would go begging. As it is, some want the kind that will, when finished, make a creditable showing in the fat stock show, such as we have at Chicago and Pittsburg. Some want to raise and feed exporters; others want butcher cattle. So, in this way, all grades are raised, fattened, and find their way to market.

As to what grade is the best money-maker for the average feeder I am not able to decide. Many would say, Why, the very best, of course. It would seem, however, to my mind that if the feeder could raise all the cattle he wished to feed, the highest grade would be preferable; but when it comes to buying these one, two or three in a place, the time in looking around and the extra cost amount to quite a little.

This grade always costs more and I will admit they are worth more; but it is a question whether we can afford to pay the extra cost and make any more on them than we can on a lower grade. Of course, we all prefer looking at the finest, whether they are the greatest money-makers or not. The buyer looks at the fat more than anything else. The greatest difficulty we all have, we do not feed long enough; we do not get them fat. The buyers are always complaining that your cattle are not fat enough. Finished cattle are always pleasing to the buyer, and always sell well, too. Most of the fully ripe cattle that go to market are from sections of the country where corn is much cheaper than it is here. So it is not wise for us to try to compete with the western feeder in the production of finished cattle.

I suppose the best money-maker for the farmer is the hog, if we can keep it healthy and free from the diseases that are so prevalent among our swine. The swine plague is one of the great problems the farmer has to contend with. It is very discouraging to have a nice lot of hogs which are thriving nicely get sick and in a few days begin dying by the dozens. And if the well ones are not large enough to sell the owner is soon without hogs, and that crop is a total loss. I have heard it said that losses by disease are a good thing, because if everybody succeeded in raising them the market would be glutted with hogs and prices would be very low; that the plague regulates the receipts in such a way that the prices are pretty well maintained all the while. Well, I don't know so well about

this. There may be something in it. I do know, however, that when you get a pig up to eighty, ninety or one hundred pounds it is only a short time until you have a hog. Raising hogs is certainly profitable if they are always healthy.

Just what to do to keep away all diseases is the question. It is very hard to tell just what does cause the cholera. Sometimes we think one thing does it, and again we think something else is the cause.

I suppose cleanliness is one of the most essential things to look after.

Frequent changes from one part of the farm to another, from one lot to another, are considered good preventives. You know the old saying, "An ounce of preventive is better than a pound of cure." Dry, well-ventilated shelter is necessary, with frequent changes of bedding; that is, haul the old away and put in new. I also think it is a good idea, where a good many are raised, to divide them in small bunches, especially during the season when they must have shelter. It does not matter so much in the summer and fall.

Use good, strong, vigorous sows, those that are well bred; not too old, either, and cross them with a male that is well bred, well developed, kind and docile, and the result will be satisfactory, if the sows have proper attention at farrowing time. I never thought it best to breed thin, run-down sows; nor do I want them fat; just in good living condition. I breed most of my sows to farrow in March and April; sometimes a few for February; and generally sell those hogs at the age of eight or nine months, weighing 240 and 250 pounds, without much extra care and without a slop feed of any kind. However, a slop feed is all right. I believe if more was used there would be less so-called cholera. All corn is inclined to make them feverish, and it is injurious to the stomach. Corn does not make the proper amount of bone and muscle. I believe if we all would make an effort to give our hogs a slop feed once a day we would have fewer losses, and we could make larger hogs by so doing, and have more money at the end of each year.

It is no bad idea for those who have a good supply of grass to raise one or two colts each year. Moderate farm work will not hurt a mare while she is raising a colt. After the colt is weaned give the mare light work all through the winter. The expense of raising colts—mule colts or horse colts—is small, and when they are two years of age you can begin doing light work with them. Be very careful, however, when the hot weather sets in, for at that time there is danger of injuring them.

One or two horses for sale each year is quite a help in farming. It is true they are low, especially the common horse. Try and raise something better than the common. Our aim should be to improve each kind of stock we are raising—make an effort to get what we raise above the common.

I believe the nicest, cleanest and easiest stock to care for is a little flock of sheep, and there is a profit in them, too. Sheep don't require much feed as long as they can find grass. They are great scavengers on

a farm; they destroy many, many weeds and kill lots of grubs. They don't require much attention. Lambing time is about the only time they do need close attention. The worthless dog is a great drawback to sheep raising.

After all, we must watch every corner in farming to make money; manage all kinds of stock carefully; exercise good judgment in getting everything ready for market. We should know how to feed, what to feed, and when to feed.

ONE HUNDRED ACRES AND HOW TO MANAGE IT.

JOHN A. YOUNG, NOBLESVILLE.

[Read before the Hamilton County Farmers' Institute.]

An all important subject to me.

And how I wish I knew! Too small to glut the markets of the world with the products raised thereon, and yet too large not to be worthy of some consideration.

One hundred acres constitutes one two hundred and fifty-six thousandths part of the area of Hamilton County. Suppose, my friends, I should fail to properly manage my one hundred acres. Do you perceive what a catastrophe it would be to the remainder of the county?

One hundred acres compared to the area of Hamilton County is insignificant. One hundred acres compared to the tillable area of the United States is infinitesimally small. And yet the management of one hundred acres is of vital importance to me, because it constitutes my business. From it I derive my entire income; feed and clothe the family, pay taxes to the "powers that be," keep up repairs on the one hundred acres and endeavor to do as much better as I can in anticipation of that proverbial rainy day. Everywhere nowadays agricultural and economical questions have assumed great importance and dominate all others. It is pretty generally conceded that on the rational culture of the soil depends to-day the power and existence of nations. Many examples could be cited to prove this fact. Formerly the methods of culture were simple. It called for no great effort of the mind to till well, to regulate the rotation of crops and the breeding of live stock. To-day the situation is different. In this century when distances have been annihilated by steam, with cheap transportation, it is no longer the struggle for existence between man and man which is in question. It is the struggle for existence between industry and industry, between agriculture and agriculture, between country and country. The old and haphazard methods, the irrational

and unscientific methods of farming have become obsolete. Intensity of competition in agricultural affairs is the order of the day. Brain more than brawn is needed. The when, the how, the why of everything done on the farm in this day is of vital importance to the tiller of the soil. His occupation is an honorable one. He is of necessity a philosopher, a reasoner, a scientific man. We believe there should be more of him in our State and National legislatures in place of too many professional men. Upon the success of the farmers of the United States depends the power and prestige of the United States; depends the success of all other branches of industry of the United States. Let his business lag and all other industries follow.

While the success or nonsuccess of our managing our one hundred acres is of no moment to my brothers engaged in tilling the remainder of the earth, it is of great importance to me. The soil of those one hundred acres constitutes my chief capital. No successful business man would think of diminishing his capital and at the same time maintain his yield of income unless he can increase his rate of income. Therefore, we regard it as suicidal to sap the strength of the soil of our one hundred acres without replacing it with a full and complete equivalent. We believe our poorest soil can be brought to a high state of fertility and without so much cash expense as many believe.

Clover is the one great fertilizer of this country. If there is anything we like to see growing on our little farm better than one field of clover it is another and better field of clover. Nor are we at all particular about harvesting it all with the mower. We prefer cattle, hogs and the plow. We invariably each spring sow not less than one-third our tilled land to clover. By this method, together with a careful preservation and judicious application of all stable and other manures accruing on the place, we have increased the fertility of our soil, and at no very heavy cash expense. In harvesting our clover with cattle and hogs we prefer good ones. We've no use for that abomination of the age—the Jersey cow. Were we financially able, nothing but the full-blood Shorthorn or Hereford could stay on our place. Nor are we at all sure we are not making a mistake in thinking that we are financially unable so to do. A herd of either of those breeds of cattle are a delight to the eye and a source of profit to their owner. We do not care to say they are the only cattle for the farm. We do say they are our choice, by long odds, and in the order named. The hog that must be kept twelve months before reaching the market stage is as much out of favor on our place as is the Jersey cow. We think we are financially and mentally unable to keep either. We also plead guilty to keeping books. We like to be able at the end of the year to know the exact receipts and expenditures for that year; if the keeping of anything has not been profitable, to inquire into the cause and endeavor to remedy it. Give us clover, corn, cattle, hogs and pure bred poultry on our one hundred acres and we are contented and reasonably happy. Deprive us

of any one of these for any extended length of time and we become discontented. You will observe that in naming the articles that we consider necessary from a financial point of view to keep on our place, we have left out many that some, perhaps a majority, of farmers of this section would consider necessary to include as sources of revenue. We will call your attention to the reason for this omission by closing as we began. One hundred acres and how to manage it. How we wish we knew!

VALUE OF THE LEAD PENCIL.

P. R. LOSTUTTER, VEVAY.

[Read before the Switzerland County Farmers' Institute.]

In this age of rapid advancement, when in a short period of years we have passed on from the sickle to the twine-binder, from the clumsy plow to the lately perfected implement; from the time when the teamster drove astride of stumps, through mudholes and forded streams, to the turnpike and steel bridges; from the lumbering stage coach to the railroad train, we are apt to conclude in the hurry of these panoramic changes that men must have less time for thought and careful calculation than formerly. But as effective action must of necessity come from accurate thinking, we can only conclude that men think more rapidly and effectively, for think we must, and each man for himself. It is said the world belongs to the thoughtful, and I am sure that the history of the past, at least that portion of it that is worth anything to us now, is but the record of the achievements of a few thoughtful men and women who have walked in the van in the various lines of human action. And these are they who have often been called cranks, innovators, agitators, and other approbrious names, because they took more pains and expended more thought upon common things than the masses of mankind could see the propriety of. In every neighborhood at the present time there are calculating men and women engaged in the different branches of business, to whom others go for advice in hope of escaping the burden of thinking for themselves. But in view of the much thinking that these must do for themselves it need not be surprising if they make hasty and inaccurate calculations for us while they successfully figure out their own course. We may expect that free advice from those who have nothing at stake in our affairs and who are paid nothing to think for us will many times be worth about what it cost us.

In fact, we ought to be ashamed to believe that so long as we have our wits and a lead pencil, anybody can know more about our business;

with a few moments' thought, than we may know with a week's, a month's or a year's calculation.

It is true, good thoughts come to some men quickly, and these, together with many that are the result of experience and experiments, may be had for the asking, and by all means we should get as many of them as we can. But still we must sort them, classify them, try them with our brains and our lead pencils and accept or reject them according to our conditions, and the better we know our conditions at all times the more sure will be our conclusions. The conviction must then come to us sooner or later, though it may not come until our hair is white and our opportunities mostly past, that success is largely a matter of figures and accounts. Some men keep accurate records, some keep less accurate records, and some keep none at all. Some men get others to figure for them, some figure when occasion requires, and some figure in advance. Now I am inclined to think that the man who keeps a record and figures in advance is the man that is likely to have control of himself and his business. The best time to buy is when we can get a bargain, the best time to sell is when we can make a fair profit upon the cost of an article. Some of us trust to luck in these matters, some to advice, some to figures and a record. Now, to keep a record it is not only necessary to have a big book—a ledger—but also a little book—a day book—together with a lead pencil, constantly in our pockets to catch things as they arise, so that when we post up we may not have forgotten a large part of our debits and credits. Our day book may run into almost endless detail or stop with very short and almost worthless jottings, such as will render our ledger of little more use to us than the scattered memoranda that some of us are in the habit of entering in words, figures, signs and hieroglyphics on the crib doors, barrel heads and in other convenient places. The matter entered and amount of pains to be taken will depend upon the judgment and disposition of the individual. But below a certain standard it can not fall without rendering the thing a matter of guesswork. Some time ago I had occasion to ascertain how much corn and hay it would take to keep a horse through the winter. I was not farming then, so I asked several farmers as persons most likely to know, and got answers something like this: "Oh, I don't know; I just feed from the hay mow and the crib and as I haven't much idea how much was in either, I can't say from my experience. But I guess so and so," and guesses ran all the way from one to three tons of hay and from twenty to fifty bushels of corn. Now when these farmers begin to keep a record and enter upon the ledger "To keeping one horse for such or such a time," I am afraid some one will make a wrong entry. My conclusion was that I might weigh a measure for a week and multiply by the number of weeks and make a close approximation, and such I found to be the case. Of course we might know more accurately by weighing and measuring all food used. But I would think in the general matter of keeping accounts with work horses, milch

cows, growing stock, chickens, etc., some such method as referred to would be making effective use of the lead pencil.

But upon this point I will say no more. The pith of the matter is that the lead pencil can be made a most effective agent in keeping the accounts that we ought to keep, as a means of daily calculation and putting down items for transfers to the ledger. Again, the lead pencil is an effective agent in catching and preserving hints and suggestions that may be useful, in jotting down receipts, formulas, etc. In short, we value a thing by what it will bring in dollars and cents, by what it will do for us or what it will help us to do for ourselves, and as an agency to help our bad memories to keep us informed upon daily details, and thus to keep us in control of ourselves and our business I know of nothing so convenient and useful as a lead pencil. With it and my little old day book we can keep posted till we post; with it we can figure the cost of everything and at what it must sell to be profitable. With it we can tell the contents of the mow, the stack, the bin and the crib, the number of acres in each field, the results of different plantings and cultivation and other experiments in growing, feeding, etc. We can know the cost of living, improving and taxation, and thus at least have the satisfaction of knowing where the nickels go that sometimes seem to slip from our fingers like a handful of dry sand. And it is possible we might stop some leaks if we should come to "miss the water before the well runs dry." I am not reading this paper as a matter of entertainment, nor can I say it offers instruction. Its purpose is rather to suggest a thought or two upon the business side of farm life. I hope it will be fully discussed, and that I may go home with more upon this subject than I bring to the Institute, not that I would have any one believe me selfish, but because I can not but feel that this intelligent gathering of farmers is able to give as a body more than any one of us can offer as an individual.

I believe the Institute will do much good. Our social intercourse here is worth much in addition to the excellent thoughts offered. We will go home refreshed and filled with enthusiasm for our calling. And why should we not? Of all classes our agriculturists are most truly nature's children. They are nursed upon her bosom and fed directly from the hand of Providence. The golden wheat, the watermelon smiling on the vine, the fodder in the shock—everything, in fact, from strawberries and cream in spring to Kelfer pears, popcorn and rosy-cheeked apples that make "December as pleasant as May," all ought to inspire us with contentment and reverence, so that we may go on with our feet in the way of honesty and righteousness "To die in a full age like as a shock of corn cometh in in his season." They, too, who have lived nearest nature's bosom have been her truest interpreters. Burns, in "The Cotters Saturday Night," has given us a beautiful picture of country life among the lowly—beautiful chiefly because of the rural simplicity, innocence and reverence of its characters, that can only fade but in the twilight of time.

He it was who immortalized the daisy and the mouse and sang so sweetly of the woods and fields, that we have but to shut our eyes to see the green leaves and flowers and hear the birds sing. Bryant put into the "Planting of the Apple Tree" only what he and you and I have seen and felt, and still the seasons go. We go out in the fields and woodlands in springtime and we hear Jean Ingelow singing

"Oh, velvet bee, you're a dusty fellow,
You've powdered your legs with gold.
Oh, brave marsh merry-bud, rich and mellow,
Give me your money to hold."

Summer comes and Lowell sings—

"And what is so rare as a day in June?
Then, if ever, come perfect days;
Then Heaven tries the earth if it be in tune,
And over it softly her warm ear lays."

Autumn comes on and we get down a volume of dear old Whitcomb and read—

"The frost is on the pumpkin,
And the fodder's in the shock."

Winter comes apace—we are snow-bound, and may be spell-bound with "Snow Bound" if we will. Still the years will go on and still Providence will continue to scatter with prodigal fingers flowers in the fields and woodlands and along the waysides. The birds will continue to wake the groves with their morning hymns and poetry will continue to be the husbandman's companion to the end of time and need only as its interpreter genius and a lead pencil on the farm.

IS IT PRUDENT FOR A FARMER TO SELL HIS FARM AND MOVE TO TOWN TO EDUCATE HIS CHILDREN?

MRS. EUGENIA CHAPPELL, ALGIERS.

[Read before the Pike and Gibson County Farmers' Institutes.]

When our grandparents settled the land where we now live, they needed the help of their stalwart sons and robust daughters at home. Every comfort that they had was purchased by work much harder than any that our young people assist to accomplish nowadays. The spinning, weaving, knitting and sewing by hand kept mother and daughters busy

every day in the year, except, of course, the sacred day of rest, and quite often their work was not done with the day, but continued into the hours of night. It took many a hard day's work with the ax for father and sons to convert the wild woods into a cultivated field. They were earning a home, beginning with no other capital than strong arms and a steadfast purpose to succeed.

The second generation, our fathers, began life for themselves in easier circumstances. This generation felt that they had been hampered and hindered by a lack of general education. They, therefore, determined to equip their own children with good educations, even though it would cost them strict denial to do so.

It goes without gainsaying that the best thing we can give our children is a good, practical education; but we have observed that there are loving but misguided parents who make serious mistakes in their way of giving it. It is the purpose of this paper to call attention to some of these mistakes, rather than to argue against a higher education for our children. Of course there is another side to this question, and it is the other side that is talked about and dwelt upon most often; hence our decision to answer it in the negative.

The gospel of popular education has been so thoroughly preached throughout the land that the uncultured now believe that a most unpromising intellect can be miraculously and mysteriously transformed by completing a course in some college.

The president of a certain one of our celebrated universities said that he once filled "a chair" in a Kansas college when that State was young. Upon his arrival at the beginning of the first fall term, he found several families living in tents on the college campus. They were completely enchanted with the magic of the word "education," and had come there confidently expecting to see their raw-boned sons and daughters made into senators, presidents, ambassadors' wives and "first ladies of the land."

Let us consider some of the sacrifices that father and mother must make if the farm is sold, then we shall be able to decide whether a genuine education is worth it or not. And what shall we say of those young people who return home to us after many months spent in frivolity more than in hard study, with a finished (?) education, that was paid for with father's hard-earned money, bringing nothing much with them but luxurious tastes that our limited means can not gratify. It is often the case that a finished (?) education, consisting of various accomplishments, rather than useful knowledge, really unfits a person for usefulness in the place where he is to live. Accomplishments are all right enough in their right place, but it is of more importance that the girls learn to cook a good dinner, and it is surely of more importance that the boys learn habits of thrift and industry. I knew one boy who studied so hard, his mother said, that he needed the physical exercise that playing croquet afforded him. Now,

she herself had physical exercise in abundance. She did the milking, tended the garden and potato patch and mended the broken fences, in addition to doing her own housework. She reverently assumed all the drudgery which the son should have performed in order to show proper deference to the superiority of his higher education. It has long been one of our pet theories that a boy can get all the physical exercise he needs by doing useful work instead of going to a gymnasium. A little work at home is splendid exercise, and, what is more, it involves no risk of either life or limb, as do the games of baseball or football.

One dear old lady who has tried it says that self-sacrifice is good for us, but the trouble is this: Some parents take such large doses of it that it ceases to be a good thing either for themselves or for their children, because it makes them poor in their old age and makes the children selfish.

The father often reasons with himself this wise: "I have done many years' work on this farm and have prospered more than I expected in the beginning. I think it is now my duty to sell out and go to town, where my children can have social and educational advantages, and where I can rest and take life easy in my old age." But, after trying town life for a year or two, this is what he thinks: "When I was on the farm I did not pay out money every day for something to eat. I had meat and flour in abundance of my own raising. How I would like to have now some of the good things that grew in my old garden. I don't like to wear Sunday clothes on work days, and I am not happy where there are no animals to feed. I miss the cattle, the horses, the poultry, and I am not sure but I really long for the company of hogs." The mothers are to be considered, too (and we all admit that they are the most overworked animals on the farm). What they want when old age makes its approach is time to rest, to read and to think. An old woman who has lived all her life on a farm will pine in town, even in a college town, for the quiet restfulness of the country, for her own house, for the fragrance of her own flower beds, and for the society of lifelong friends. It would be imposing a great trial upon her to ask her to leave all these and try the unfamiliar ways of town life. The best education in the world is too dearly purchased if it costs the sacrifice of such a mother.

This recalls to mind the case of one family known to me. The children were all grown up, and two of them married and living on farms of their own near by, when it occurred to the old people to mortgage their farm for money to take the younger children through college. The old people were both in feeble health, and should have ended their days in peace and plenty and quiet on their own farm. But, no. They must move to Bloomington, where they could enjoy all the advantages of a college town. The mother struggled bravely with the housework, giving her daughter all of her time for study, putting up with such inefficient hired help as she could get. She even kept a few boarders to help keep up family expenses. But the crisis came within the second year. The

mother's mind gave way under the strain and she was taken back to the farm, where she died before many months had passed. The mortgage was foreclosed and the father became dependent on his married children.

There was another successful farmer of my acquaintance who sold out and went to town to live. He said he should never die satisfied until one of his sons became President of these United States! Poor old man! What a vain ambition! He evidently died unsatisfied, for one of his sons became a second-class lawyer and the other a school teacher, but neither of them has succeeded in doing as much for his own children as their father did for them.

The desire to have our children well educated and to have them holding honorable and useful positions in life is quite commendable. Such a desire is as natural as it is for us to wish to provide good clothing for them or to have them well fed. There may be some children whose future career would make their parents wish that they had invested the price of a good farm in their education, but unfortunately the sciences of psychology and phrenology do not yet enable us to pick out the children with brilliant futures from among the "vulgar horde."

If your children really want an education they will be willing to work for one. The young people on a farm have better opportunities for earning money for themselves than anywhere else, and we think they will be more self-reliant if they are encouraged to work their own way through college. We say, give every one of your children the best education possible if you can make the farm pay for it, but don't sell the farm. Go to town to live if you want to try it, but keep your farm for a safe refuge in times of adversity. When your sons have failed in politics, in professional life or in some other business; when your daughters have failed to marry bank presidents or railroad magnates, then the farm will feed the whole family.

When a man has grown old and feels that the time has come for him to give up hard work, it is better for him to retire on his own farm, amid all the comforts it affords. Some one has said that we have been long enough on the problem of "How to keep the boys on the farm," and that we ought now to consider "How can we keep the old folks on the farm?"

So much for the old folks. But is town life the best for young folks while character is forming? We think not. No doubt as good children can be reared in town as anywhere else, but it is much easier to lead them in the right way when we have them on the farm, away from evil influences. Children brought up in town seem to outgrow parental restraint much sooner than country-bred children. There is nothing that expresses our meaning any better than to say that they get "too smart." Then so many of them have their mental horizon narrowed until it is bounded by these three ideas only: First, some good clothes to wear; second, some place to go to display them, and third, to win an ardent admirer for their fine appearance. It is very hard for us to insert ideas of the higher and

nobler purposes of life into this circle of thought. It is our opinion that this is the reason why the young people reared on farms are furnishing intellectual and industrial impetus to the towns and cities to-day.

If your young people have become convinced that the business of farming confines the operations of their mighty brain powers within too narrow limits, if they feel that brilliant careers await them in some other occupation, don't clip their wings; but, in helping them to soar away to loftier heights, don't ruin yourself, for we have observed that no old person is happy who is dependent upon some one else for support, even though it be one of his own children.

THE FARMER'S HOME AS IT IS AND AS IT SHOULD BE.

W. F. ROBBINS.

[Read before the Jennings County Farmers' Institute.]

When I received an invitation from your secretary to prepare a paper for this Institute upon this subject, I was at a loss to know what course to pursue. That word "home" has such a wide and comprehensive meaning; there is so much of good or evil that may be said of it that, while I was considering where to begin, I was confronted by the question, Where will I find a place to stop? This is not a subject that can be encompassed by a paper to be read in the time allotted here. It is a subject that is as old as the world and older, as wide as the universe and wider, and is only confined by the limits of heaven upon the one hand and the uttermost regions of despair upon the other; and whoever the speaker upon that topic, he need never complain that his subject had not sufficient scope. Since it is the purpose of these papers to provoke discussion, I shall in this paper endeavor to take up only such phases of the question as will be of practical value to us as farmers to discuss.

During last summer I had occasion to drive across the eastern side of Decatur County, and through a neighborhood that was entirely new and strange to me. I expected to inquire my way at the farmhouses along the road, but I want you to know that I traveled four miles through a thickly settled part of the county without coming within speaking distance of a human habitation, and when I did come to a home, located near the highway, I found the barn occupying the post of honor and the dwelling just over behind. I found those people good farmers in so far as the treatment of their land and stock was concerned. They had large and substantial buildings but of rather ancient style of architecture; their improvements were all of a substantial character, and their stock, although

scrubs, were well fed and carefully housed, sleek and fat. And I marveled that intelligent men would thus isolate themselves from the world.

They are still building new houses and barns, some of them a half mile from the highway, and making roads at their own expense across their lands to get to and from their homes. One residence in particular I noticed was located on the corner of a 200-acre farm most remote from the highway, on a northwestern slope, with the house fronting—if it had any front—to the northwest, while on the southeast corner of the farm, near a crossroads, the land was gently undulating, sloping to the southeast, thus making an ideal spot for a farm home.

Statistics show that a very large per cent. of the inmates of our insane asylums are farmers' wives, and, if you will take the trouble to investigate, you will find that 90 per cent. of them come from homes of the kind described.

The farm home should be located on the brightest, sunniest spot on the farm, provided always that that spot is near the public highway. A southeast slope is preferable, but even this advantage should be sacrificed if necessary rather than locate the dwelling far from the road. The everchanging panorama of travel upon our country highways is a source of pleasure to the whole family. It varies the monotony of the ceaseless drudgery of the hard-working wife. It is like a daily paper to the husband and forms a very valuable part of the education of the children. Build your house near a thoroughfare—the greater the better—that your children may keep in touch with the outside world, so that when they go from the parental roof it may not be with a kind of "I-am-green" expression written on their countenances and in their speech and actions.

Much depends upon the location of the home, but of still more importance is the architectural construction of it.

This country is dotted all over with great barn-like structures that people persist in calling farm homes. Call them farm buildings. Don't degrade that sacred word "home" by applying it to such structures. If you enter one you find it cold and cheerless, one large room underground, two on a level with the surface and two more somewhere between there and the mansions on high. The man who built it had lost some of the cunning of his ancestors who built the tower of Babel; for they built continually toward heaven, while he built two stories toward heaven and one in the direction of the other place. Hundreds of times each year the tired wife climbs the stairway toward the regions of bliss—pity she couldn't go all the way—while the old man hobbles down the stone steps toward the other place—and I had thought of saying "pity he couldn't go all the way for building such a house," but the punishment seemed too mild. Now, why did the farmer build that kind of a house? To economize; you see, if he built all of that house on the surface it would occupy one-fifteenth of an acre, but by making it three stories high it would only occupy one-thirtieth of an acre, and land being worth \$30 per acre, he saved a

dollar. He had no doubt read somewhere that "a penny saved is two-pence gained," and he figured that he was two dollars ahead by the transaction. He made no allowance for loss of energy occasioned by climbing stairs, nor of ill health or doctor bills occasioned by breathing the poisonous vapors arising from decaying vegetable matter in that hole in the ground called a cellar. But why build a two-story house on a farm? The risk both from tornadoes and lightning is greater, and land is not so valuable in this country that we need to economize in that direction. Besides, in every house the children are only temporary tenants, and sooner or later the great house has for its occupants only two gray-haired, decrepit old people, worn out climbing stairs—stairs to the bedroom, stairs to the cellar—until they would shudder at the thought of climbing the golden stairs but for the anticipation of wings to aid them. And that cellar! You have heard of the fellow to whom the devil owed a debt and paid it in sons-in-law. Well, at the same time he owed a debt to another fellow, and paid him by putting a cellar under his house, and still you find people trying to collect what his satanic majesty owes them and taking it mostly in cellars.

A farmhouse should be one story, well above ground to avoid dampness. Should be a frame for the same reason, and should be surrounded on at least three sides by wide porches or verandas. Cellars should never be used. A fruit and vegetable house separate from the residence can be constructed cheaper and better. The construction of a milkroom properly belongs to the subject "The water supply for the farm," and this topic is extensive enough without trespassing upon a subject assigned to some one else.

The suggestions I have offered concerning the location and construction of the home are merely the prelude to the subject proper. The real home bears the same relation to the material structure that the soul, mind or spirit bears to the physical body. Four walls, be they brick, stone or frame, do not constitute a home; neither does the physical structure make the man. There is an indefinable something above, about, within—a something that arouses the finer sensibilities of our natures that is a prime essential in the creation both of the home and the man. Where the heart is, there is the home. I have in mind a place that ought to be a home, where the husband and father is a chronic grumbler. A want of energy on his part when he was a young man brought on an attack of the blues from which he never has nor never will rally. One of his neighbors has said of him that he is the most even-tempered man he ever saw—always mad. His wife is one of the best women in the world, as such men's wives always are. They have raised a large family of children, but they leave home just as soon as they are old enough to earn a scanty living. I said they leave home. I should have said they leave the place of their birth. They have no home. Where their mother lives would be a home but for the continual grumbling and fault-finding of their father. Such

a man can never possess a home in this world, and whether or not he will have a home in the next world will depend upon the question of his sanity. Cheerfulness is the prime factor in building a home, and parents will find it a difficult task to implant in their children dispositions of a kind which they fail to cultivate for themselves. If hard work makes you cross and ill, don't work so hard. The world will go on just the same and you will live longer. If the cares of business make you want to quarrel with some one, don't lay the blame on your family and quarrel with them.

When I was a boy an old uncle gave me a little bit of sound advice. Said he: "There are just two things you should never worry or fret about. The first is the thing that you can help; go to work and help it. The second is the thing that you can't help; it is useless to fret about that." And I offer it to you in the same homely language as a panacea for a thousand evils.

Anger and worry shorten life, and it is well that it is so. People so afflicted are usually incurable, and it is no doubt a pleasure to them, as it is to their friends, to have it over with as soon as possible. Invest more money in the things that beget cheerfulness and less in the things that bring 20 per cent. on the investment in filthy lucre. Make more round corners, and fewer acute angles that are so annoying when you run up against them in the dark. Last summer a man living near me concluded that some one was stealing his corn, and placed his shotgun in the crib in such a way that the gun would be discharged in the direction of any person who opened the door. He was so well satisfied with his man-trap that he slept very soundly that night; so much so, indeed, that he forgot all about the trap, and went to the crib the next morning, opened the door and met the load of shot coming out. Fortunately, or unfortunately, he was not hit in a vital part and lived to tell his neighbors what a fool he had been. This man was no more foolish than are we who build improvements upon plans and in places where they will exist only to annoy us. Man-traps! How many of us are constantly building them to be ourselves the victims! Man-traps in old wells left uncovered for the stock to get into; man-traps in hedge fences; man-traps in poorly constructed chimneys and flues, causing fires; man-traps in hogs that eat chickens, thereby spoiling your wife's disposition; man-traps in doors that won't open when they are shut and won't shut when they are open; man-traps in screens that will let all the flies in, but won't let any of them out. Continually building traps for ourselves, and then get cross and mean when we fall into them.

Did you ever notice that gnats are much more annoying than large flies? It is the small annoyances that vex us. Hew your path to avoid the small obstructions and you will have more strength to overcome the larger ones. And as a first step toward the cultivation of cheerfulness, let us cease building man-traps.

Not long since one of my neighbors came over to borrow a pound of nails, a hand-saw and hatchet, a two-inch auger, a brace and bits, a jack plane, a square, a scratch-awl and a drawing knife and a few bolts, assorted sizes, if I had them to spare, which of course I had. Why shouldn't I? Said he was making a hay-rack, and incidentally remarked that he always had to do all of that kind of work himself. He said it looked like his boys couldn't learn to use tools at all. He "didn't see why, but, by gum, they didn't seem to have no knack of makin' nothin'." He actually seemed to think those boys were lacking in ingenuity. And why should they be otherwise? The repair tools on that farm consist of an ax, a cross-cut saw and a threat from the old man to lick the first boy caught using nails.

What kind of homes are we providing for those restless boys of ours? Are we providing the tools and material for them to work off that surplus energy with which every strong, healthy boy is endowed? It is not best to try to absorb all that energy in what the boy will consider work. If you do your boy will become tired and learn to do his work in that listless, unthinking way seen in people who are always found at the bottom in all the avocations of life. Labor is not a natural but an acquired habit. Acquired by a hope of reward. The reward to your boy is the pleasure he feels when he views the product of his labor—the creation of his brain and his hands working together. Give the boy frequent half holidays to spend as he pleases, and place within his reach such tools and material as he needs to construct the things fashioned by his brain, and home will be home to him. Set up a workshop for him and don't wait until the devil has established one in his brain by reason of its idleness. Instruct him in the use of hands and brain, thus enabling him to carve out a home for himself and posterity better than the one you have been able to make for him.

And the girls; what of them? Do they go to town to have all their clothing made by a dressmaker, or do you buy tailor-made suits for them? And do they spend their time studying fashion plates and reading cheap literature, going to balls and parties and listening to the silly twaddle of some dude who has to part his hair in the middle to maintain his equilibrium? Such conditions are not unknown and are to be found in almost every neighborhood in the land. If your daughter is frivolous and cares only for fashion and the empty pleasures of life, I shall not hesitate to say that it is your fault. Girls should be taught early in life to lend a hand in all the household duties. The mother who performs all the drudgery while the daughter entertains company, or is being entertained, commits a crime the results of which will linger to vex and annoy her for many years to come. I do not mean by this that your daughters should be slaves or drudges. Far from it. But they should be trained to useful employment and steady habits. The farmer's daughter should be able to arrange the home to make it attractive, comfortable and pleasant. She

should be taught to entertain both in the parlor and in the dining-room. If she can only entertain in one part of the home, her sphere of usefulness in the world will be proportionately prescribed; and the home that she attempts to make for a husband will be only half a home. To the young man looking for a life partner I would say, visit her home on Sunday afternoon and if she entertains you with the latest and best music on the piano or organ, call around again the next morning, and if you find her on the back porch with tub and board playing the Irish washerwoman, don't wait; you may lose a fortune; pop the question then and there, and if you are not just what you ought to be, ten to one she won't have you.

A few years ago I heard a man say that his children did not care anything for books or papers, and after I had visited his home, or what ought to have been his home, I was not surprised at the remark. He was what some folks call a very religious man. There were several sons and daughters of ordinary intelligence, the material of which the bone and sinew of this nation is made. I found the literature of that house to consist of a Bible, one church paper and such schoolbooks as the children were obliged to have. They had just got the latest edition of the almanac and the children had almost torn it in pieces in their efforts to all read it at the same time. Now, this man pretended to believe that the Bible and his church paper were the only literature that his children ought to have, but after a more intimate association with him I was convinced that he was a hypocrite of the first water. He was so inordinately stingy that he would not spend a cent unless he was compelled to; and his charge that the children did not like to read was a vile slander, uttered to cover up his own meanness.

Every successful farmer knows that his horses, his hogs, his cattle, his sheep, require a diversified ration to promote their physical growth and to insure their healthfulness, but how many otherwise successful men and women we find who fail to realize the importance of a mixed ration of mental food for their children. Your children don't like to read the Bible, history, religious works or statistics. Why? For the same reason that they don't like salt pork. You have fed them on a single ration until their systems demand a change. Feed them on fruits, vegetables, roast beef and sweetmeats a while, and they will turn to salt pork with a relish.

Every intelligent boy or girl is just as surely possessed of an earnest desire for more learning as of an appetite for foods to build up the physical body. And it is the imperative duty of every parent to so provide and prepare the mental food for those entrusted to their care that the desire shall not be dulled or blunted by too much of the salt pork of literature, but may be enlarged and increased as the child grows to mature manhood or womanhood.

Now, I think I am safe in saying that you, ladies and gentlemen, who compose this audience, have stored in your barns and cribs thousands

of dollars' worth of hay and grain to be fed to your domestic animals. Let me ask you a question: How many thousand dollars have you invested in good literature to be fed to your children? I ask the question, but shall not insist upon an answer, for I myself would be ashamed of the answer that truth would compel me to make if the question were propounded to me. But, if we do not answer it to each other, let us answer it to ourselves as individuals and see whether or not we are doing a better part by our hogs than we are by our children. If such a state of facts exist, let us try to reform if it is not too late. If the children seem to find more enjoyment elsewhere than at home, let us begin our reformation by subscribing for all newspapers published in the county. In our county it is somewhat expensive—six local papers—but I am taking the medicine I am offering to you, and think it is doing me good. Take at least five of the great weekly newspapers—one from each of five great cities in different parts of the country. Take a daily paper if you can get it; some good periodicals for the girls, one or two more for the boys, a few farm papers, and the Youth's Companion for the whole family. In connection with these, purchase such musical instruments as your means will justify, get a game board and a few of the simpler card games, and invest your whisky and tobacco money in good and interesting books, and, instead of your children leaving home to seek amusement, you will have to stand at the door with a club to keep your neighbors' children from overrunning the house.

Now, you expect me to say something of the finances of the house. Perhaps you expect me to say that the family purse should lay on the center table, its contents the common property of the whole family, to be used as their wants, imaginary or otherwise, may dictate. On the contrary, I am of the opinion that in finances as in everything else, the home should have a head, and that head should be that member of the household who, by reason of education, experience, or other qualifications, is best fitted to assume the responsibility. In addition, every member of the family twelve years of age and over should have resources adequate to their needs to spend as they please. You say the children will spend it foolishly. Perhaps they will. In fact, judging them by their parents, I know they will, for every mother's son and daughter of them has inherited from their parents a desire to cut their eye teeth. Give them an opportunity to do it with small sums, and they will not buy as many gold bricks later on as we have done.

Upon the subject of religion in the home, I can not say much without being accused of preaching what I fail to practice. But permit me to say, there are already too many Methodists in this country; there are also too many Catholics, too many Baptists, too many Disciples, too many Presbyterians, and not half enough Christians. Teach the children, and ground their faith in that great fundamental principle of right living,—the golden rule, "As ye would that men should do unto you, do ye even

so to them," and leave questions of doctrine and modes of worship to be determined by their mature judgment.

In conclusion, the farmer's home should be a common school, a high school, a music school, a technical school, a school of moral training, a place of amusement and a place of worship; a place of business and a place of rest; a place where the sharp corners and the rough edges have been worn off by the abrasion incident to good, moral, social intercourse—a place where the whole family may have pets, but where no individual should be the pet of the other members of the family; a school where all are alike pupils and teachers; a place well furnished, but not so well furnished as to preclude the possibility of free play to that exuberance of spirits incident to the young; a government in which there are few laws and in which the executive relies largely upon the veto power; a place to which the children will cling because they love it rather than on account of its intrinsic value; a place made sacred by its associations and its memories; a school in which men and women are trained in the manual of arms that will fit them for conquerors in the great battle of life.

HOME ON THE FARM.

FRANK HENDERSON.

[Read before the Tipton County Farmers' Institute.]

Having been raised on the farm, I do not know the advantages of a home in the town, yet I have never desired to exchange the home on the farm for one in the town; but with gravel roads which are here and free mail delivery which is coming, it would seem that all objections to a home on the farm are removed.

The product of the country school has been able to keep step with the product of the town school in the business of life.

The home on the farm is, by its fresh air, opportunity for early rising and healthy exercise, conducive to health and to bodily and mental vigor. The home on the farm is a college within itself, the teacher being nature. There is not so much danger from epidemic and contagious diseases on the farm, nor is there so much danger of corruption of the soul by immorality.

The size of the home need not be equal to a township, as a happy home may be erected and maintained on eighty acres or even less, but the income should always equal or exceed the outgo, and care should be taken that the greatest possible good be done with the least possible outlay of work or expense. Economy, however, may be run to excess and

ruin the home, but, being lazy, I say we should expect the greatest possible effect and utility with the least possible work.

The house should be situated on rising ground, from ten to twenty rods from the public highway. The grounds in front should be set in blue grass and white clover, which may be used to pasture the horses or sheep, but should not be grazed too closely, as then it would look barren. It is not the place for hog pens, which should be kept well to the rear.

The dooryard should be small, as a small yard is more easily taken care of in the busy season. A few flowering shrubs may be set out provided they be neat and healthy looking when not in bloom. While rose bushes are very pretty when in bloom, they are often very unsightly when not in bloom, so the fewer the better. A few sugar maple trees or other pretty shade trees should be planted for shade. The size of the house must depend on the ability of the owner, as there can be no true home where the shadow of removal darkens, but a house with more than eight or ten rooms makes too much work for the wife, and makes a laboratory instead of a home. The more plain and substantial the furniture and equipment the less restraint in using, and consequently the more homelike; by that I mean furniture, etc., that there is too great danger of soiling.

Where it becomes necessary to employ steady help, with board, care should be taken to employ only such as are morally fit to enter the home, and then they should receive the same treatment and respect as other members of the home.

There can be no true home where truth, honor or love and kindness do not prevail. The child raised in a hut will, if raised in kindness and love, look back on home with more satisfaction than one raised in a mansion amid quarrels, bickerings, crossness and neglect. Nor can there be a true home where wealth is the sole object. I do not wish to decry wealth; on the contrary, a competence is desirable, but it should not be obtained at the expense of needed rest and enjoyment. Many children are driven from the farm by overwork and lack of liberty and amusement. Overwork either causes a disgust for work or a grasping disposition.

The only etiquette necessary is charity, kindness, decency and the Golden Rule. If these be diligently followed, the home will be without jars or discords. No home is complete without a library, if only a few good books, but the more the better; books that are immoral and irreverent, however, should be shunned as we would shun persons of such characters. Books that apologize for evil or hold up admitted evil in an enticing light, as *The Life of Jesse James*, for instance, should never be allowed around the home.

It is not necessary nor advisable to try to keep up with recent literature, as much of it will not stand the test of time; but there is much from the pens of Irving, Hawthorne, Cooper, Emerson, Prescott, Bancroft, Longfellow, Whittier, Poe, Riley, etc., together with English, French, Roman and Greek works, to make a good farm home library.

In the matter of periodicals aside from political and religious newspapers, there is plenty in the magazine line that is entertaining, instructive and cheap, and to my mind no home should be without two or three of them, the dollar magazines being almost as good as those costing from three to five dollars, and much better for the money. There are children's magazines that will tend to form a reading habit as well as to amuse and instruct, and some should be supplied. If plenty of the above be supplied, there will be less desire to be away from home on the part of the younger members of the family and the problem of how to keep the boys and girls on the farm will be partly solved.

It has been said that cleanliness is next to godliness. This applies to the farm as well as elsewhere and to the master as well as the mistress, the barn as well as the house, the barn lot as well as the yard. Weeds should be mowed, rubbish burned, old lumber neatly piled or burned with rubbish; manure piles should not exist after April 15th; buildings should be kept in repair.

It should be regarded as much of a breach of parental duty to fail to provide mental food where the ability to furnish exists as it is to fail to furnish food for the body.

There is nothing more beneficial in the recreative line than music, both vocal and instrumental—good music, and where there is musical talent, it should be provided with training and instruments.

RELATION OF SANITATION TO HEALTH.

DR. ELMER SHIRTS.

[Read before the Greene County Farmers' Institute.]

It gives me special pleasure to respond to this invitation to present to this body some of the necessary sanitary conditions and application of hygienic laws in the preservation of health. One of the most important conditions is a constant supply of fresh air. Only 20 per cent. of air is oxygen, the constituent appropriated by the body in purifying the blood. Breathing eighteen times per minute and twenty cubic inches at each inspiration, a healthy adult will inhale 1,130 cubic feet in eight hours. The average bed room contains about 1,080 cubic feet of space, or nearly enough air for one person eight hours.

Suppose, now, that you crowd four persons into this space, close all the windows and doors, leave an oil lamp burning and require these persons to spend one-third of their time in such a place, what can you expect? And yet, my friends, this picture is not overdrawn. What is the

remedy? Ventilation. How? Lower the windows or open the transoms and blow out the light. Provide means for the escape of the vitiated air, and fresh air will get in. Arrange the bed so the sleeper will avoid the draught and the night air will not hurt him.

But few doctors contract contagious diseases for the reason that they go from the patient out into the fresh air and sunshine, the greatest of all purifiers, and the contagion is destroyed. I also believe the old-fashioned fire-place or grate is far ahead of the more modern method of projecting a volume of hot air from a furnace for heating purposes. Look after your ponds, which are often converted into cesspools of filth, thus contaminating not only the water, but the air as well. I cite you a case in this town where a cesspool is made the dumping ground for all manner of filth, which lies there and decays, producing an intolerable stench, and I have no doubt many cases of sickness could be traced to it. For the last seven years there have been from three to seven cases of typhoid fever each year on that one street alone. Have you ever stopped to count the cost of such things? The doctors have repeatedly called the health officer's attention to this place, and still it remains there. Farmers, if you must have ponds, keep them clean, and you will be repaid many times in the better health of your family as well as that of your stock. Running water is best where it can be had, but this is not practicable in all cases. I then would recommend deep wells and wind mills bringing the water from the depths of mother earth. Look well after these things and you will have less and less use for the physician each year.

Allow me, also, to warn you against a very common practice in farm life—that of throwing all the refuse from the house into the back yard. Don't make a slop trough of your back yard and around your wells. Many cases of summer diseases may be traced directly to this practice. Sprinkle a little air-slaked lime over the filthy places on the farm once a week. Farmers can do much toward warding off disease by giving the proper attention to the care of their barn yards, too. Do not allow the weeds to go uncut. They are a fruitful source of malarial fevers.

Not long ago I read in the Youth's Companion "that the greatest detriment to the health of the American people was the frying pan, bicarbonate of soda and pie." Eat more light bread and fewer biscuits, more boiled dinners and less fried meats, more mush and milk and less pie, and you will be amply repaid by more strength and vigor, sweeter sleep with fewer dreams, and increased health generally.

Last but not least, never complete a farm house without a bathroom, and let every member of the family use it at least once a week.

READING AND THINKING FARMERS.

ELMER G. TUFTS, AURORA.

[Read before the Dearborn County Farmers' Institute.]

Of all the necessities to-day for the betterment of agriculture, there is none greater than the need of more reading and thinking farmers.

The farmer requires more knowledge, intelligence and mental strength. Intelligent methods more than hard, manual labor insure success to the farmer of to-day.

Muscle may have been the essential requirement forty years ago, but to-day it takes intelligent thinking. The days of the log cabin are past, and with them has gone the timbered acres, the virgin soil, the ideal climate, old ideas and methods of the farm, the farmer and his home. Then they had or thought they had, forests to burn; to-day we are studying and devising means for replanting a part of our land to timber. Then they knew nothing about fertilizers; they had no use for them, as they thought their soil was inexhaustible. To-day this question is of great importance to the farmers, and he who has studied and is willing to continue to study the subject is on his road to success. Then a drought was scarcely heard of; to-day it is almost an every-year occurrence, and we are forced to study the best methods of cultivation to conserve the moisture for the use of the crops through a drought. These two subjects alone require a vast amount of reading and thinking on the part of the successful farmer.

To-day it requires a large amount of intelligent study and thinking in preparing the soil, in planting, in cultivating, in harvesting; and in these days of combinations and close competition it requires more thought to market the products of the farm. He must become familiar with the condition of production, price and trade, supply and demand in all quarters. In short, he must produce the best at the least cost, and intelligently place it upon the market. He can not do this unless he is a reader and a thinker.

On the part of the successful farmer there is as great a requirement of good, strong mental work as in many so-called professions.

It is in the minds of the reading and thinking farmers where originate new and better methods.

Agriculture, with its various branches, offers a wide and splendid field for research and conquest. The botanist, florist and horticulturist have changed the old plain, single, one-colored flowers to the large, double, various-colored ones, and the small, wild, sour apple to the large, fine, standard varieties of to-day by a study of grafting, budding, hybridizing,

cross-fertilization and improvement by selection. This improvement opens up a way toward greater possibilities. So it is in other lines.

Some one has well said, "We are beginning to realize farming is a science, demanding research and investigation; an art, requiring thoughtful study; a profession, opening a broad field for mental vigor and activity." It is wide-reaching, including many sciences. In studying the composition of the soil and the history of its formation and origin the farmer applies chemistry, geology and mineralogy. In studying the evolution of the vegetable kingdom he calls upon botany, including the structure of plants and vegetable physiology. In studying the animals that stock the farm he resorts to animal anatomy and physiology. It would be well to go a little further and acquaint himself with the birds that visit the farm by a study of ornithology. In this way he learns what species are friendly to his pursuit and those that are not. And then in these times, when the farmer's crops are ravaged by swarms of insects of numerous species he should study entomology and learn the names and habits of injurious insects and the best means of subduing and exterminating them.

Therefore, we must heed the demands of the time—read more, study more, think more and put into practice what we learn.

A progressive farmer is a diligent student. He can find no task too difficult to be mastered, no question passes unnoticed, unsolved. Not only those pertaining to the farm and the farmer, but all questions.

By reading and thinking he gains ability, and from ability system, courage, attention, application, the most valuable aids to any man of business. It is knowing how to manage and do farm work—the application of what we learn by reading and thinking—that insures success. The right thing must be done at the right time. System and punctuality go hand in hand.

The reading and thinking farmer will learn to be more of a man of business. There is no other industry that could be carried on without a loss conducted in the unbusinesslike manner of agriculture, and this is only because of its vast resources.

It is as important that the farmer should know what it costs to produce a ton of hay, a bushel of wheat, corn or any other crop, as that the manufacturer should know the cost of producing any article he is manufacturing. While we must admit the former is the greater undertaking, so it is of greater importance. The farmer does not need to employ an expert bookkeeper, for if he is capable of managing a farm he can conduct this part of his business. I know from experience that it takes a great amount of time to keep farm accounts. Nevertheless, it pays in many ways. Try it and you will find that the time thus spent will bring greater returns than more than twice the amount spent at anything else.

These accounts will form a foundation upon which to do deep thinking and planning for better and more productive crops, to say nothing of

the satisfaction there is in knowing on which side of the ledger your account will be at the end of the year.

It is worth while now and then to stop and look over our conditions and surroundings and make a study of the way we are farming to see in what degree we are contented with existing conditions, and, if not, in what way they may be improved. From such a survey we may see possibilities for improvement and progress, and discover new theories and methods and abandon the old.

Changes are taking place in all lines of business, and the farmer must keep up with the procession. The whole industrial world is ever studying how to accomplish purposes in a more direct, better and cheaper manner. They are trying new processes, perfecting old ones and developing higher results.

The farmer is not alone in his difficulties, for all industries have problems to solve and perplexities to overcome; and, by successfully overcoming them, they climb step by step the ladder of success.

It is a fact that the thinking minds lead, and that, in modern farming, intelligence, with its improved and skillful methods, has a decided advantage over traditional farming, where the son continued to follow his father's methods and laughed at "book farming."

The farmer is learning, whether he wishes to or not, in the school of experience. He can do a great deal voluntarily in adding to his enlightenment by a good, hearty, earnest effort to do so. He possesses greater opportunities to gain knowledge than of any previous age. Reading matter of the choicest quality can be had at a very low price. The best of our farm weeklies are now offered for little more than the white paper they are printed upon. They discuss and comment on all subjects relating to agriculture, and no farmer who is trying to improve can be without them.

The United States and the several States have a large number of educated and observing men at work investigating "farm questions," and they are doing good work and making valuable discoveries. The reports of these investigations are published in bulletins, which will be sent by the Department of Agriculture and the different experiment stations for the asking.

All of the publications are of the very highest importance to the farmers, and would surely lead them out of the old ruts into better ways if they would only receive, read and practice what is taught in them.

A man's individual experience is limited, but, by reading the papers and books, we learn of the united experience of many men who have traveled the same or similar roads, from which we gain ideas that might never otherwise have been thought of and which are of the greatest value to us.

Point out a successful lawyer, and he will be found in his office carefully reading such books and papers as will best aid him in his profession. The farmer should follow his example.

The reading and thinking farmer's reading table must be supplied with at least a religious paper, a good magazine, one or two of the best farm papers, a paper devoted entirely to his specialty, for this is an age of specialties, and, shall I say a daily? There is but little truthful news in the daily paper as published to-day, and less that enlightens and uplifts its readers. If all the news worth reading in the average daily were sifted and condensed, it would scarcely make half a column. The farmer has not the time, to say the least, to search through from four to sixteen pages and find so little, and, besides this, think what will be the influence of the rest of the paper upon the home circle! Would that the daily paper of the nineteenth century could be buried so deep that it could not see the dawn of the twentieth to mar and degrade the minds of the coming decade.

While it is true the farmers need the daily market reports, yet could they not find other means of securing them? With a telephone in every farmhouse, connected with the village, then with the town, and then the city—the market centers—may not this be the solution to the problem, and give better and more satisfactory results? Time alone will tell. Therefore, in place of the daily substitute a good weekly, devoted to current events.

It is not enough to depend on the farm papers and books on agriculture to supply the full needs of the progressive farmer. He must not only acquire the knowledge necessary to the proper management of the farm, but he himself and the members of his family must receive that mental culture which will enable them to better appreciate the blessings of their vocation and lift them out of the monotony of daily life.

There needs to be something done to bring into our homes more books and papers, that, as a result, the boys and girls on the farm may have a greater taste for good books and a stronger thirst for knowledge.

Some one has said, "Let every man, if possible, gather some good books under his roof and obtain access for himself and family to some social library. Almost any luxury should be sacrificed to this."

The library may not be a large one to commence with, for it can be added to from year to year, but it must contain the best literature, as good books will have a great influence in moulding the character of the young people in the home and will lift them up to a better usefulness and to a nobler life. The poet says:

Books we know

Are a substantial world, both pure and good;

Round these, with tendrils strong as flesh and blood,

Our pastime and our pleasure grow."

I know a young man who, while attending the high school, felt the need of a good home library, and resolved that he would spend for books what most boys and men spent for tobacco, cigars and other unnecessary

things, and that he would add to this library as many books as possible each year. To-day he has a library of over three hundred volumes of the choicest literature, a great many agricultural and experiment station bulletins, and is a subscriber to five of the best farm papers published. These books and papers have had a great influence over all the household of which he is a member. This same young man has never let a day pass since he left school in which he has not read some paper or chapter in some book.

If all farmers and especially the younger ones, would adopt this means of securing a library, they themselves would be better off, and would be greater readers and thinkers, and accordingly more successful farmers.

We plow, sow and reap. Let us also read and think. Let no one say that he must leave the farm in order to be near the great currents of thought. It is said, the expanse of the horizon, the vigor of heaven's own aid, the power of pure sunlight, the constant and close exhibition of great forces are influences that should brush away the cobwebs and give the farmer the power of clear vision.

In conclusion, I wish to affirm that the reading and thinking farmer will learn that the secrets of successful farming are to have a love and interest for it at heart. He has taken up the work from choice, and with the expectation of receiving enjoyment from it and making progress year by year, and not work along in a listless sort of way and be content just to make both ends meet. He will learn habits of economy, be industrious, improve his ways, and in all respects be up and doing, ever ready to catch new ideas that will help along the line to success.

He will consider that agriculture in a highly improved state is the means, next to righteousness, which truly exalts a nation and contributes to its enduring prosperity. He will become a true citizen—one who fully realizes the responsibility he bears to his God, to his country, to his fellow men. He is a man of high standing and influence among his countrymen, a man of much thought and integrity, of great courage and stern determination. He tries really to be what he is; he is satisfied with his vocation but dissatisfied with his conditions, and therefore always makes improvements. He always tries to be a better farmer but never better than a farmer, as there is no happier home on earth than the home of an intelligent farmer, a true patriotic citizen, one who tries to do all he can for the commonwealth and the prosperity of the community.

FARM LITERATURE.

HENRY S. STRATTAN.

[Read before the Orange County Farmers' Institute.]

It is impossible in a paper on this subject to name and designate the special features of each and every publication, but we may, without intending to show partiality to any publication, point out what we believe to be of interest to country readers.

By farm literature we do not understand it to mean simply our agricultural papers, but everything in fact which will help to build up and make better men and women. The human soul craves sympathy, and, because of this, is ever ready to tell its story to others, be it of joy or sorrow. Can we not go a little farther, and say that our literature really springs from this source? All of our great authors through their works are simply giving to us their feelings and emotions. No one will dispute the fact that good literature is one of the greatest influences which can be brought to bear upon the mind. It is not always possible for us to mingle with great men and women of genius and be fed with the food of their thought, but it is possible to a certain extent in all of our homes to hold communion with these great minds by perusing their works, and if we can, in this paper, show the necessity for such literature and the good that may result from it, we shall feel that not all our work is in vain.

Our subject naturally divides itself into two phases—literature which will help the farmer from a professional standpoint and that which provides culture for himself and his family. The progressive farmer must have the papers which are published for his particular interests. In them he will find many things which he can turn into practice on his own farm, as well as many which may seem impracticable to him, but which set him to thinking along lines that need investigation.

This is a day of progress, and the farmer who would succeed must gain what he can from the experience of others. Any successful farmer will tell you that the money he has put into a good agricultural paper makes him dollars where he has only cents invested.

The Indiana Farmer serves well the needs of the farmers of this section. The advertising in its columns alone is worth much to the farmer, putting him in touch with the people who are specializing along the different lines of stock raising.

If there be a need for reading matter that pertains to the farm, there is a still more crying need for the literature that brings culture and

broadens the lives of those who live upon our farms. Books, and good books, too, are so cheap that there is no excuse for the absence of them from our homes. The value of a shelf of books containing Longfellow, Bryant, Lowell and Whittier, with at least a few volumes of Shakespeare, can not be estimated. We do not need a great number of books, but we do need these. The boy or girl who grows up without these rich legacies has lost something that can not be replaced. The boys and girls on the farm are of vastly more worth than anything else to be found there. Give them the Youth's Companion from the time they can read. It is adventurous enough to suit any boy, and for current events it has everything in a nutshell. Give the children a chance to see the life of Little Lord Fauntleroy as shown us by Mrs. Burnett. Let them live over again the lives of Miss Alcott's Little Men and Women. Let Kate Douglas Wiggin's books have a place in our homes, and there will not be the cry that the boys and girls, the young men and women, want to leave the farm. Good literature in the home will do more than any other one thing to make the young people see that the farm is the ideal place to live.

The farmer has as much need of his daily paper as has the business man. It is an encouraging fact that more dailies are coming into the country homes. Let the daily be clean and reliable, of the class so well represented by the Chicago Record-Herald and the Indianapolis News. The county paper has its place, which can not be filled by any other publication and is found in most of our farm homes. In some homes there are no papers whatever. Some men, and men of means, too, pride themselves in the way in which they provide for the physical wants of their families, and yet they will spend little or nothing for reading matter. These things cost money, and money is not always plentiful on the farm. The question is not, can the farmer afford good literature, but can he afford to be without it. The character of a person is largely revealed by the class of literature which he reads. What we read leaves some impression with us, be it good or bad. Trashy literature should find no place in our homes.

We spend money for the improvement of the stock upon our farms, for better and more convenient buildings, and all the things that need improvement, and surely we must not neglect to provide literature of the best kind for the boys and girls who are the ones for whom the farm and all upon it exist.

THE FARMER'S SON.

MISS MYRTLE CONGER, FLAT ROCK.

[Read before the Shelby County Farmers' Institute.]

Perhaps some of you may think I have chosen a subject about which I can have but little knowledge. I have had, however, a very intimate acquaintance with three farmer sons—my father and my brothers.

I can't remember the beginning. Long ago, in my childhood, my father used to take me on his knees in the quiet winter evenings and tell me such wonderful stories! How well I remember the history of the fussy chick-a-biddy and her wee, woolly peeps gathered under her wings at night. "Some day," he said to me, "they will be grown up, and then we will sell them and buy something for the daughter." He's been selling them and others like them and buying something for the daughter ever since. He used to tell me, also, about the wheat growing out under the snow, and the little yellow corn grains that were going to come up in pretty green stalks. And when howling March winds would frighten me into closer refuge in his arms, he used to quiet my childish fears by telling me that they were trying only to dry the ground so that I could go out of doors and play once more.

My acquaintance with my brothers was of a different nature somewhat. Their stories consisted mostly of "giants and goblins" that would surely "get me" if I told that they played truant from school; and of "terrible monsters" that would certainly "eat me alive" if I ventured with them into the woods to gather nuts.

I could tell you of other and more recent acquaintances with other farmers' sons, but I trust you are already satisfied as to my ability to handle the subject.

What is like the country?

Who are like its people?

See the young farmer at home on his farm. How he enjoys it; the meadows, the streams and the woods that are his. See the herds of cattle grazing in his pastures; the sheep that come at his call; the horses, the swine, the poultry and the Belgian hares. They all know him; they trust him, and if he has any conception of the divine, he must feel something of the joy of the first man when he viewed the creatures that had been "made good," and over which the Creator had placed him master.

What can compare to this wonderful animal life, each kind with its own peculiar characteristics and intelligence? Nothing. Nothing, however great an example of wonderful architecture or skillful human labor,

can compare to these living, breathing examples of the work of the Master Hand.

The young farmer himself is the truest type of man. He is honest, if homely in his ways; he is straightforward, even if sometimes brusque; he is sincere, though pretty speech and compliments may not spring from his lips. Above all things, he is genuine. His life has been spent among genuine things, and all that are his are genuine; his hospitality, his home-made clothes and—his bank account. The heart of the farmer lad is a patriotic heart. To-day at West Point there are more sons of farmers than of any other profession.

Let me pause a moment to ask some questions. Why should the name "farmer" cause a smile or suggest a picture of rustic ignorance? Why do our city friends laugh at the boy from the country who visits their town and gazes about in wonder at the things he sees there? For my part, I can't see that he is any worse than the city-bred lad who visited us once and wanted to tap our apple trees in the dead of winter to get some cider, or the Shelbyville fellow who said he would be delighted to help us shake pumpkins.

Why do our city friends write funny (?) jokes in their papers about the farmer who bought a gold brick in their town? Should they not rather blush with shame that they have men in their towns who sell gold bricks?

The country has produced the majority of great men and great minds. Far back in ancient sacred history we read of Saul and David being called from their farms to become rulers over Israel.

The Romans met Cincinnatus in the fields at work and asked him to take charge of an army. In our own country we have such an example in Israel Putnam, who, in the beginning of the Revolution, took his horse from the plow and rode twenty miles to enlist. Nearly all the soldiers of the Revolution were farmers.

America's two greatest men—Washington and Lincoln—spent all but a few years of their lives on farms, and, had we no other examples than these, they alone would suffice to prove that the country is the mother of noble children.

What was it that set these two men apart from all others? It was their own personal worth, their value as men, such as are produced only on farms. We have had other men more eloquent; other men with greater grace of speech and manners; men of more pretentious dress and broader learning. We have had other statesmen, too. We have had orators, diplomats, ministers, inventors and literary men, all of whom our country is rightly and justly proud, but none have ever climbed the heights whereon these two shall forever stand. And if any ever do attain such eminence, they will not be from the cities' crowds.

Nearly all the generals in the civil war were from the country. Sherman, Grant, Sheridan, Logan and Schofield were farmers' sons.

So were the noted men in the Spanish-American war, and in the Philippines.

Of our twenty-five Presidents, all but seven have been farmers or sons of farmers. The cabinets of our Presidents have always been well supplied with farmers; so have the Senate and the House. Indiana, who has always been given credit for wonderful wisdom and discretion, has chosen almost all her governors and her congressmen from among the farmers.

America's trio of poets—Longfellow, Bryant and Whittier—lived in the country.

Asa Gray, Harvard's celebrated botanist, learned his first lessons on plants from the flowers of the fields in which he labored. Leland Stanford, of the famous Western university, was an awkward country wood-cutter. Cyrus McCormick framed his idea of the reaper while wielding the scythe and the sickle.

Jay Gould and the late C. P. Huntington, our noted millionaires, were country boys.

At this very moment, our greatest men are products of the country. President McKinley was raised on a farm. Roosevelt is proud to have spent years in the wilds of the western plains.

The Hoosier State is full of them. Senator Fairbanks is the son of a farmer; our junior Senator likewise, and he spent his early life in a log camp. Our Governor and our Governor-elect boast of their country birth. General Lew Wallace and James Whitcomb Riley are products of the country.

Then why should not the farmer and the farmers' sons be honored? Why should not they be entitled to a share of the best there is in life, if they want it?

Last year we spoke largely of these things, and I think we all agreed as to the privileges which are justly theirs; those at least that should be justly theirs.

Are we any nearer these things this year? We have, it is true, more rural free deliveries in this part of Uncle Sam's vast kingdom, and the collector from the telephone exchange stops at more houses each month, but have you seen anything of a surveyor down your way staking a route for an electric railway? How about new high schools and libraries?

Farmers, if we are not nearer these things this year, whose fault is it? Is it ours, or is it some one else's? Could it be that we are responsible through our lack of perseverance and insistence? There is a fault somewhere, and it is certainly not in the stars.

THE VALUE OF A HIGHER EDUCATION FOR THE FARMER.

BETTIE OFFICER, VOLGA.

[Read before the Jefferson County Farmers' Institute.]

Much can be said of how to elevate the farmer in his calling, but nothing of how to elevate the calling. The grandest and most honorable one is that of the honest tiller of the soil. But how to elevate the farmer is a hard problem to solve, when there is such a combination of circumstances holding him down. One great trouble with the farmers is, that instead of helping themselves, too many of them have been expecting others to help them.

They have become so accustomed to existing circumstances that they don't know that there is anything better in store for them. They have accepted the situation because they think they have to. While men in other callings combine for mutual help and benefit, the farmers have never been able to work together in harmony. It is time that they were waking up to their own interests.

Man was created for a high and noble purpose, and if he uses the power given him it will elevate and ennoble him, and I believe that on the farm the conditions are more favorable for the development of all that is good and great in man than in almost any other calling. Let him take, for example and encouragement, the lives of some of the most celebrated and distinguished farmers. Some of the grandest and noblest men and women whose names adorn the pages of history were born and raised on the farm. He can reach the highest elevation if he put forth the necessary effort.

We find the truth in these words: "We must educate or we must perish." Men in other callings have to be educated to succeed, and the reason that many farmers do not succeed better is because they do not study enough and before the farmer can ever take his true position he must have a better education. He has to bear the heat and burden of the day; and for lack of knowledge, which he might possess, has to labor under great disadvantages. If farmers were better educated they would be more able to take care of themselves, be more independent. They could organize to protect and benefit themselves, because all other industries are organized, and the farmers are at the mercy of the forces combined against them.

Farmers should encourage everything that has an elevating influence, such as the improvement of the farm and roads; insist upon having better schools; provide good books and papers for the family, for there is nothing that has a more elevating influence.

We often meet people who have the idea that young people who intend to become farmers do not need an advanced education. They speak of it as money thrown away. And can this be true that they should be allowed to grow up in ignorance without the advantages of an education? Let us see. Why should not the farmer receive as good an education as those who pursue any other profession in life? Surely farming is not a degrading occupation, but on the contrary it is one of the most honorable professions known. Cicero, the great Roman orator and philosopher, speaks of the pleasures and benefits of country occupations as surpassing all others. He said this fifty years before the beginning of the Christian era, when but little advancement had been made along the line of farming. Surely his assertion is true. Herbert Spencer defines education as a preparation for complete living. Then in order to live in the true sense of the word, one must be educated. This is true of the farmer as well as of any other person.

The educated farmer is always making improvement, while the uneducated farmer is dissatisfied with his vocation, and, on account of his ignorance, he must plod along in the same routine, with but very little chance for advancement or improvement. What a great pleasure it is to the educated farmer to observe the power and trace the process of nature in her vegetable productions. The disadvantages of an advanced education are very few in comparison with the great advantages.

Possibly there might be a few cases where education might make the farmer discontented, thinking that his calling was too lowly, but this never occurs where the nobility of farming is truly appreciated.

No other calling dates back so far into antiquity and no calling is more elevating to the mind. More attention is now being given to this industry than ever before, and it has been found that farming needs as much good, sound judgment and as good business principles as any other profession. Education is the vital factor in the development of the race, and its value can not be overestimated. Generally speaking, ignorance leads to poverty, and it is among the ignorant and uneducated that we find the most misery and crime. In looking back over the history of our race, we find that there has been great development and advancement. All this has been made possible by education. In view of the fact that this higher development has brought the world out of darkness into a broader light of knowledge, and broadened the minds of the people so that they may be more able to live and appreciate life in its highest sense, should the farmer, then, isolate himself from the onward movement, or should his tendencies be upward? The position of the farmer of to-day is entirely different from that which was offered to our ancestors. The independent farmers of years gone by, when they produced nearly all their needs, have passed away. The log cabin and home-spun clothing then afforded both comfort and happiness, the road wagon the necessary means of travel, and to be able to read and write was considered sufficient edu-

cation. These conditions have all been changed. The introduction of the many labor-saving farming implements has given the farmer a chance to employ himself with other things than mere drudgery and constant toil. The successful farmer has time to read. Through his farm papers he learns how to obtain the best results from his work, and goes at his task with a system which is founded upon the experience of others. He finds that he can not rely upon the old fixed rule, handed down by his father, but as new conditions arise he must be able to meet them with new methods.

The time given to many people to improve their minds is wasted. They have not had the advantages of an education, and they have no conception of the many good things that lie within their reach, and therefore are unable to receive them.

Every year education makes an advancement, and colleges and schools are being erected and instituted for the benefit of America's future men and women; yet how few of the farmers' sons and daughters are benefited by this step. Those obtaining the most good from these institutions are patrons who reside in the cities, while many of the farmers' children are even deprived of a common school education by being taken from school at an age when school work would be most beneficial. Wherein lies the fault? It surely is, in the majority of cases, the fault of the parents, who have not been led to see the value of a higher education and who think that the place for their children is on the farm. There may sometimes be a lack of means with which to provide a better education. On the other hand there are more who are able to provide for this than who can afford to miss it. Again, they may think when they have learned facts from the text-books that they are educated. But what they get from text-books is merely knowledge. Education is the development of the mind, leading us to think more deeply on the subjects nearest us. Some may say, My children will never be teachers, they do not need so much learning. They will stay on the farm. But do we not need good farmers as well as good teachers? Do not the lives of all classes of workmen depend upon the farmer? Therefore, why not educate? We need honest men in farming, those who have a practical eye for making the nation better. They should be taught to see the real beauty in everything and that there is a place for each to fill in this life. They should be led to see that it is their duty to make others better by their living and to study and gain ideas that will not only benefit themselves, but those around them. We notice that the successful man of to-day in any branch of business is the one who thoroughly understands it. If it be the merchant, we find that he not only knows how to buy and sell, but when and how to carry on the business in a successful manner. If it be the banker, we find him to be equally as efficient in business transactions. The same is true with the physician or lawyer. If one were to follow any one of the occupations or professions without first properly educating himself for the position, he would be a

failure. But notice the young man who desires to become a successful banker, lawyer, merchant or minister; he must spend several years in colleges and universities in order to get the necessary knowledge. And is not this true of farming? Is it not true, that if one desires to become a successful farmer, he must be as equally well equipped with knowledge pertaining to farming as the banker or lawyer? The time is past when plowing and sowing are all that are necessary to secure a harvest. This may have been true fifty years ago, but it is not true to-day. The time has come when the farmer must have knowledge of the soil; that is, he should know the exact nature of the substances which compose it and the substances which are necessary to plant life.

You ask, Where is the young man or woman to get so much knowledge? The answer is, In universities and agricultural schools.

Let them spend as much time in fitting themselves for farming as the young lawyer or physician. There is a tendency among young men who are raised on a farm to leave the farm and seek other employment in the cities. He thinks that if he could only get to the city that he could secure a good position and earn ever so much money; but usually he finds that some one else is just ahead of him, and he himself has a hard time of it. Some of the older farmers may think that too much stress is put on education, because they never attended a university or agricultural school. But have they not been educating themselves for the last forty or fifty years? A great deal that they now know has been gained by experience, and pretty dearly bought at that sometimes. The fact that of the many millions of our people that are engaged in occupations, about one-half are employed in agriculture, and less than 3 per cent. belong to the class of lawyers, physicians, ministers and teachers. This shows the necessity for broadening our educational system to include the larger class, for which little special provision has been made. There are thousands of young men and women on the farms of Indiana who did not appreciate the advantages of a good education and let pass the opportunities of acquiring it, who now see the errors of their ways and desire some means of better fitting themselves for life's struggle in their profession. They realize that there is something beyond the reach of their minds, and they long to grasp it. There seems to be something in the way—a hindrance they imagine they can not overcome—and, when they undertake to solve the problem, they arrive at the conclusion, "I haven't the time." It is not so much a lack of time as a lack of system and know-how and a will to change. Children should be taught that the destiny of a nation depends largely on the farmer, and they should also be taught that all life is not a struggle for wealth, and that there is as much true happiness in the country home as there is in the most stately mansion. I hope that in the future more of the farmers will realize the situation of their sons and daughters and take advantage of the opportunities afforded them in securing a better education for them.

After the child arrives at the age when he or she is capable of choosing a profession and desires to be better fitted for the calling which has been chosen, it should be allowed the privilege of doing so if possible at all.

If the choice of the boy be that of a lawyer, send him to a law school; if it be a doctor, send him to a medical school; if it be a merchant, send him to a business college; but if it be a farmer, send him to an agricultural school, such as our own State affords at Purdue University at Lafayette, Ind.

NEEDS AND IMPROVEMENTS OF OUR RURAL SCHOOLS.

MRS. LIZZIE DYER, LAFAYETTE.

[Read before the Tippecanoe County Farmers' Institute.]

Although the good resulting from the public school is almost without limit, and it has been and is a great factor in the civilization of the world, still nobody claims that they are perfect. In fact we all realize that they contain many defects, and men and women are earnestly seeking remedies to overcome them. Especially is the great agricultural mind of the country directed toward the rural school. The majority of our farmers get all the schooling they ever have from the country school. According to statistics, only about 5 per cent. of the pupils of the common school go beyond the eighth grade, and only a little over half beyond the fifth grade. Thus the farmer must look to the common school of the country for the building of his future generation. With so great a result in view, neither time, money nor thought should be spared in building up the rural school to the highest possible standard. We see in the boys and girls of today the men and women of the world's to-morrow. Through their better education we see the future uplifting and ennobling of agricultural pursuits, when the common farmers will not be looked upon as "hayseeds" and "clod-hoppers;" when we will see no American farmers like Markham's "Man with the Hoe;" "Bowed Down by the Weight of Centuries;" "On His Back the Burden of the World;" but, instead, a great class of free, independent, intellectual, practical, progressive, up-to-date beings, holding the power of the nation in their hands.

The needs of the rural school are many. Just what is the most urgent need is a mere matter of opinion on which people differ. We will enumerate the most important as we see them: (1) better teachers; (2) interested parents; (3) better buildings and surroundings; (4) some change in course of study; (5) better trustees and supervision of schools.

Some people say, "As the teacher is, so is the school;" but since the schools belong to the State, and the people make the State, it seems that

the schools are just about what the people make them. Nevertheless, we want to rest the blame of imperfections in our schools about equally upon the teacher and the parent. We want better teachers, high-grade teachers, who are broad-minded, noble-souled and highly cultured. The very best are none too good for the great work they have to do. We give our children into their care: they guide and strengthen and develop the child's life; they build his character, and, in building the character of the child, they build future society and future civilization.

With this result in mind, let us consider what constitutes an ideal teacher. We will divide her qualifications into three classes—(1) the moral, (2) the intellectual, and (3) the aesthetic.

One of the most important moral qualifications is honesty. Not the honesty of the business world, if that is as David Harum represents it, making the golden rule to read like this: "Do unto the other fellow as he would like to do unto you, and do it fust." That construction of it wouldn't do for the teacher. If the teacher is honest with herself, she will be prompt in the performance of duties and will not become so sympathetic with her overburdened self as to shirk any of her duties. A teacher who pretends love for her pupil, who pretends to have his interest at heart and is really indifferent, who knows the pupil has committed a wrong and does not correct him for it, is not honest with the pupil. It is a dangerous thing not to be honest. A pupil is quick to observe. He soon determines what a teacher is. Dishonesty destroys all confidence and respect. Honesty is the basis of all right moral character. And never can true moral character be established unless the teacher is honest. The other moral qualifications are kindness, firmness, sympathy and love for pupil and work. It is easy enough to have a genuine sympathy and love for a few pupils—the bright, clean and well-behaved ones—but not so often does the teacher have any sympathy for the bad boy or the dull boy. To succeed as a teacher one must love the work engaged in. Interest on the part of the teacher creates interest on the part of the child. These moral qualifications of the teacher comprise the government of the school, and we all know the disastrous effects of a poorly governed school. One winter with a teacher who can not govern a school casts an influence upon the children of that district which it will take years to eradicate.

The first of the intellectual qualifications should be a thorough and special preparation. We believe that none but high-grade teachers should be employed—those that have a broad, liberal education and have especially fitted themselves for the work.

Then the teacher should know the child. If they are life-builders, they should know life. We believe in specialties. If a child has a natural aptitude for some one thing, he should be encouraged and developed along that line of study. Too often, when the teacher does not understand the abilities and the possibilities of a child, he becomes mentally starved for

lack of the kind of mental food he craves, and consequently his natural tendencies in that line become dwarfed; he becomes disgusted, gives it up, quits school, takes up the commonplaces of life and does not know until it is too late what he "might have been."

Coupled with a good education is another indispensable quality of a good teacher, and that is progressiveness. There is no room in our country schools for the teacher who is not progressive. One who has not interest and energy enough to keep up with the times had better retire. When we cease to grow, we retrograde. In this busy day and age of progress we can not afford to stand still. We must on to the front with the advancing army of progress or step down and out and give room to some one else. We have too many old, fossilized teachers, who are pensioners on the teaching profession. They think they have a hold on their position by right of possession; that twenty or twenty-five years in the work gives them a life-time position. Of course, all these years spent in teaching would add to their value as teachers if they had been progressive; but they are in the old rut so deep, and haven't the energy to make an effort to get out. Such as these should be debarred from the profession.

The aesthetic qualifications are a love for the true, for the beautiful and for the good. These are the elements that make up the noblest part of life. One possessing these is capable of the highest enjoyment of life. A teacher who does not possess them can not create them in the mind and heart of the child. Now, to sum up, we have shown that the best teacher will be honest, kind, sympathetic, will love his work, will be highly educated, progressive, and possess a love for all that is true and beautiful and good. These are the better teachers we want. Too ideal to become real, you say. We have only to raise the standard and the teacher will raise herself to it. Those that can not must drop out of the ranks. Raise the standard and raise the wages accordingly, so the teacher will be justified in preparing herself for her life's work and maintain the dignity of her profession. If we had a higher standard to be reached by teachers before they are employed, we would have fewer persons using the profession merely as a stepping-stone to something else. We regret to say we have many of these, especially among the men. They teach two or three years to enable them to study law, or take a medical course or something of the sort. And too many ladies, we are sorry to say, who engage in teaching a few years to better their condition socially, and soon nearly every one of these comes to the conclusion that it is easier to permit some young man to procure a clerk's license than it is for her to get a teacher's license for herself, hence she leaves the profession. The teacher's work should be a life's work, and one that engages in it should be willing to sacrifice along other lines, and each year added to her life should add to her proficiency as a teacher.

Now, about the parent who is equally to blame, if not more so, than the teacher, for the defects in our school. We can not truthfully dispute the fact that a great majority of parents are deeply interested in the welfare of their children, yet, a great many fail to manifest any interest by real, intelligent concern in the work of the school. Some are just indifferent or so engrossed in business that they do not stop to consider their children's welfare. They probably hire a man to take care of the cattle and pigs and oversee the work to see that it is well done, but their children receive no overseeing. The teacher is hired and the children go to school, and that is about all they know about it. Then, we fear that a great many parents are not able to judge of the efficiency of school work. Another difficulty is that parents are not progressive along the line of education. They cling to past methods, to the three R's, the little red schoolhouse, etc., and are continually quoting how "I got my education," and are willing to have their children brought up in the same old way, with one exception, they oppose the beech rod. They are progressive in other things. They adopt the up-to-date methods in farming, and it seems to me that it would be as sensible to harvest our wheat by the methods employed fifty years ago, in spite of the better facilities furnished us by invention, as it is to employ the methods in school now that were used fifty years ago. The advancement in one is as marked as in the other, and yet every new text-book and method ever introduced into the schools have been fought by the parents. Even yet, let a teacher introduce a new method into the school, and how many patrons are ready to criticise long and loud and poison the minds of their children against her, and then, if she does not succeed in interesting their children and making them learn, they growl and howl and criticise louder than ever; and who is to blame? The teacher has all these things to hamper and hinder her work, and probably not one parent, very few at least, will co-operate with her for the best interests of the school. I wonder how many parents realize the importance of the early training of the child. The home is the first institution that ministers to the wants of the child. It drills him in his first lesson of living for others instead of self. It teaches unconsciously the sacred relations of the home and family. The wise parent understands the value of the example of the parent and the value of imitation on the part of the child, and will do everything he can to emphasize the home tie, and everything he can to prepare the child for his larger duties. With this end in view we teach correct oral speech, cleanliness of person, respect for the rights of others, reverence, obedience, promptness, truthfulness, honor, politeness, etc. These the child must live from day to day until they become habits; until they are instilled and drilled into the very soul of the child and become a part of himself. How great is the force of habit. How much easier it is for the parent to make the child into a bundle of good habits from infancy up, than it is for the teacher to take him at the age of six or seven and tear down bad habits

and build good ones upon the wreck of the bad. The very first years of the child's life is the time when impressions are most lasting. "As the twig is bent so the tree is inclined." Can we, then, as parents, if we neglect to set a good example before our children—if we neglect to plant in their little hearts the seeds that develop into all these good characteristics, if we neglect to direct their growth—can we honestly expect the teacher to take up the product of our failure and transform them into high-minded, noble-souled men and women? We think not. The child when he enters school is a reflection of the home he came from. Ours, as parents, is the most serious responsibility.

The need of better buildings and surroundings demands our attention. Let us contrast the advantages of the city school and the country school in this respect. The city school has a good, warm building, uniformly heated, with comfortable seats; nice, clean floor, maps, charts, encyclopedias, a library, musical instrument, excellent facilities for school work; walls decorated with pretty pictures; the children walk to school on good sidewalks, scarcely soiling their shoes, and can sit comfortably in any part of the room. Now the country school: The children wade in mud, snow or water for probably a mile or a mile and a half, generally the deepest mud being just around the schoolhouse door, which they can't help but carry into the house on their shoes, and it soon dries, becomes dust and floats in the air for them to breathe; the house is old, open, unsightly and cold; the wind whistles through holes in the windows and floor and crack under the door; the room is heated by one old stove, ready to fall to pieces and has not been polished since it left the shop; the pipe and flue have not been cleaned out for probably ten years; the house is probably full of smoke; the children sit shivering in different parts of the room, with wet feet, and eyes smarting from smoke; probably they will be permitted to sit near the stove, where, when the fire takes a notion to burn, their faces will bake and their backs freeze; the pupils have the pleasure of occupying old, broken, battered, carved desks; they look upon the wall and see what used to be a blackboard, but which is now so scaly that it comes nearer being a whiteboard. What a pretty picture this school, as described, makes! How comfortable! How conducive to health and mental activity! The teacher will probably feel sorry for the children and herself and appeal to the trustee, who shakes his head and says, "Can't do it; there isn't any money." Or maybe the children will complain to their parents and receive the comforting assurance that "It's better than I had when I was your age and went to school. The taxes are high enough now." Do people love money better than their children? Do we not know how important in the moulding of character are bright, pleasant, cheerful surroundings? Do we not know how beneficial to the health of our children are good, comfortable school buildings, well lighted and ventilated? Do we not know that without physical comfort we can not obtain the best mental activity? If the people know all these things, why do they not awaken to their best interest and provide better school buildings?

In the past there has been almost nothing in the course of study that would help the pupils to understand the farm or create in them a liking for farm life. In fact, most boys and girls are glad to escape from the farm as soon as possible, and look upon it as only a place of hard manual labor and no place for the exercise of brain power. We think that in the future nature study will supply this deficiency. Nature study will teach the children to observe the common things around them closely and accurately. Not only to observe them but to be interested in them. Nowhere is this necessity of accurate observation of nature more needed than on the farm. It will also lead the children to love nature and consequently the farm. This would be important, because already too many men farm because they have to, not because they take any pleasure in it. One constantly dealing with nature ought to love nature. The more boys and girls find to interest them in rural surroundings the more they will love farm life. Nature study ought to show the boy that there is an endless chance for development and study on the farm, and, instead of being no place for the use of brain, the future farmer will have use for all the brain he can muster up; and, for the ultimate benefit of the farm, boys and girls must be made to see that education and farm life will work together.

We have just one more point to consider, and that is, the trustee's part in improving the schools. A man should have an educational qualification to make him eligible to the office of trustee. Too often the trustee is a man who is not capable of judging of the efficiency of school work, hence he does not employ the best qualified teachers and does not oversee the work they do. So the work all over the township is done in a slipshod way, where, if they were all well organized under the strict supervision of a competent man, much better work would be done. We know it is done in the cities.

It is a deplorable fact that the teacher's position does not always depend upon merit. Too often the trustee is ambitious and dishes his schools out around to his political friends to be used as rungs on which he may ascend to the top of his political ladder. And many times the woman teacher who has not any political lifts to bestow, must migrate to some other township because she is so unfortunate as to have a father, or a brother, or cousin in politics on the other side. As long as personal merit and fitness are disregarded in the selection of teachers, no high standard of work can be expected.

THE FARMER AS AN APOLOGIST.

MRS. C. S. M'CORD.

[Read before the Parke County Farmers' Institute]

Why should there be any ill feeling between townspeople and country people? Why should a difference of occupation or of a few miles in locality occasion dislike and distrust? As far back as history takes us there have been strife and hatred and bloodshed between the dwellers in towns and their neighbors in the rural districts, even though they were of the same race, the same land, the same tongue. I have sometimes thought it must have begun when only the second man in the history of the world who tilled the soil killed, in a fit of jealous rage, his brother Abel, who was of a different occupation. At all events, the feeling is still here. I think we are all aware that it is the custom of our brethren in the cities and towns to laugh a little at our expense; the term "country-jake" is still one of reproach. If anything is "country" it is very objectionable. Mr. Hayseed and Farmer Mossback have long furnished the background for the funny man's jokes in the magazines and newspapers. Will it always be so? Must the farmer always appear in the role of apologist? I am quite sure he will not. The good time coming may be farther off than I suppose, but with the advent of the telephone, the bicycle, the good roads, the good vehicles, all tending to easy and quick transportation, the two classes must come to know and understand each other better, and that is the surest solution of the difficulty. Besides, people realize at the present time better than ever before what an important factor the farmer is in the progress of a country. They can not read history without learning that no country ever rose to prominence that had not agricultural prosperity for a basis. And there is nothing like a community of interests to bring people together.

But is the fault altogether on one side? Is there not some justice in their criticism of us? We all know that country life is the ideal life, but is it so ideal that there is no room for improvement? Why are there so many farmers' wives in the insane asylums? Why does the gold-brick man always choose a farmer to work his schemes upon? Why do so many farmers' daughters leave home in search of employment? The movement of population from the rural districts to the cities is arousing a good deal of discussion. Do these young people wish to escape the drudgery of farm life? Is it because they consider the farm so lonely? Man is a gregarious animal. The instinct to herd together is a perfectly normal and natural one, especially in youth. If a farmer refuses or neglects to provide social

opportunities for his sons and daughters, he is fighting against nature, and that is always uphill work, and likely to cause disturbance. And I have known farmers who appear to make an idol of work; as, it seems to me, they put it before any other interest in life—health, society, education—and that brings me to the point I wish to emphasize: Does the average farmer attach sufficient importance to the value of education? Any school-teacher will tell you that the pupil whose parents discuss his lessons with him at home will have a great advantage over the one who dismisses all thought of study when he leaves the schoolhouse at 4 o'clock. Yet how many farmers know anything about their children's studies? If it takes nine months of the year to educate boys and girls in town, why should country pupils have only six, or five, or four? We ask that physicians, who have the care of the body; that preachers, who have the care of the soul, shall have years of special preparation in that particular branch of knowledge; but how about the teachers, who have the care of the mind? Don't we usually employ the cheapest we can get? How often is it the case that a young girl who wishes to earn enough to buy her wedding outfit, or a young man who has no thought of teaching except as a temporary expedient, is employed in the country schools? And in some respects the teacher has a more serious responsibility than even the preacher, for he has his pupils under his control for five days in the week, instead of one, and that, too, at the most formative period of their lives; and he has the opportunity to reach the great number who never attend church services, who are entirely out of the reach of religious influences, in many cases. Abraham Lincoln once said that the American people may go wrong, but they always wobble right again. It seems to me that they wobble right again because the common people are finally aroused to the matter. You can fool all of the people some of the time, you remember, but what if the time should come when the average of intelligence would be so high that you couldn't? There are more farmers than men of any other occupation. If they were once awake to their power, what reforms they might bring about! Look at the bold dishonesty in public places; look at the frightful waste of money in public affairs; look at the injustice in taxation! How many farmers knew that the Washburn anti-option bill would have affected agricultural interests, and how many knew how it was defeated? Do farmers really believe that the operation of the board of trade schemers are any advantage to the farmer in the long run? A dealer who handles hundreds of thousands of dollars' worth of grain every year tells me that there is nothing whatever to hinder us from getting a dollar per bushel for our wheat, only that we allow the bears on the board of trade to keep the prices down by their questionable schemes. Last year we sold to Europe over a hundred million bushels of wheat. You can easily estimate for yourself the annual loss. It seems almost incredible.

Perhaps you will say that a farmers' alliance has been tried in the form of the Grange and other similar movements, and has failed, but may

that not have been because those organizations soon gravitated into politics? If you ask a life-long Republican to vote against the Republican party, or a Democrat to vote against Democracy, you are asking him to do something he is pretty certain not to do, if my observation is worth anything. It seems to me that if anything can be done, it must be on a strictly non-partisan basis. My friends and neighbors, I wish to appeal to you for an indulgent hearing. I am hampered by my inability to adequately present to you this matter, in which I am deeply interested. Surely the most determined and self-blinded optimist, in view of the injustice, the oppression, the unnecessary suffering in the world, must admit that there is occasion for improvement. But any reform will be only retarded by the lack of understanding and sympathy, the distrust and suspicion of one class for another, of those of one occupation for those of another. With malice toward none, with charity for all, is the spirit of real progress.

And I can not but believe that the remedy I have tried to call your attention to is at least a step in the right direction. Let me leave with you the ancient Latin proverb that has lived through the centuries because truth is always immortal: "Vox populi, vox Dei"—the voice of the people is the voice of God.

HOW TO LIVE.

WM. NOONAN, HARTFORD CITY.

[Read before the Blackford County Farmers' Institute.]

Theorize and philosophize as we may, over matters national and international, ethereal or terrestrial, the question of greatest moment for the consideration of the tolling, molling millions of mankind everywhere is how to live; not merely to exist, to be fed, and sheltered from the rigor and mutation of climate and season, but to spend the few fleeting years of an earthly pilgrimage happily, grandly, by contributions, yea even by sacrifices, for the elevation, the betterment of humanity.

That we live in the best age of the world's history and in the greatest country on the globe is the proud boast of every true American.

Our free institutions, unlike those of the tottering despotisms of the orient, whose tyrannical and unhallowed rule owes its existence to the power of a mercenary soldiery, certainly presents to our view a finer field for the development of a true manhood and womanhood.

From the twilight of history to the present hour the fierce and unequal struggle between human rights and human greed has gone merrily

on. Even in a land dedicated to human freedom, the home for the exile and oppressed, with its boundless resources of forest and field, factory and mine, the waking hours of the great multitude are spent in the battle for bread (and the assuaging of an unquenchable thirst), having neither time nor inclination, either by precept or example, to impress upon the minds of the rising generation that a purer life, a nobler manhood is preferable to the ordinary existence of the thoughtless crowd.

The material needs of life are few and easily obtained, and should not receive too much attention; but the range of the intellectual, the spiritual, is practically without limit. The greatness of a nation is not in its broad expanse of territory, nor in the value of its varied and useful products; nor is its strength in lines of frowning forts, armored battleships, and embattled hosts, but in the kind of men and women she turns out.

The best part of man is his mind; but it is patent to the casual observer that a majority of people do not cultivate their minds.

Now, of what value is a fertile field or farm if not cultivated? Will not weeds and briars mar the beauty of the finest landscape? Are they not indigenous and racy of the soil, requiring constant effort to keep them in subjection? Are not the unused minds, lying fallow like a neglected field, a greater national loss (yea, a great danger, too) to a government like ours than can possibly arise from a depression in all of her leading industries? If the roses are left to fight it out with the weeds, do you think the fittest will survive?

When Madame De Stael asked Napoleon what France needed most, the stern warrior replied, "A race of good mothers."

What America needs most in this trying hour is a race of good fathers. Men free from the enervating vices of civilization more degrading and embroiling than beset those of less favored and benighted lands, for whose eternal welfare we are so very solicitous.

To our mind too much stress is placed on ceremonies and formalities—political, religious and social—causing us to lose sight of the stupendous fact that the world is our country, to do good our religion (if we have any at all). Ignorance is the bane of freedom, happiness, progress.

Mind is the chief instrument by which man advances and by which each step taken becomes the vantage ground for further efforts.

While by thought he can not add a cubit to his stature nor create even a tiny atom, he can extend his influence and power over the universe to almost an infinite degree. The brief span of human life permits the individual to go but a short distance; yet, if only a little substantial progress is made, the status of mankind will have an upward trend as the coral polyps, building one generation upon the work of the other, eventually elevate themselves from the bottom of the sea.

Mental power is the great motor of progress; and advancement is made in proportion to its judicious expenditure in the extension of knowledge, improvement of methods and the betterment of the social condition.

Let us hope that the new century will give to all, not a hog's nor a lion's, but a man's share in the general prosperity, and culture become a common heritage, as we think it was no part of a divine plan for good men to enjoy while others suffer.

History shows an unbroken record of wrong in the pursuit of wealth. Commercialism and Christianity are prime factors in the affairs of men, outweighing all other influences to such an extent as to direct the course of civilization.

While those two forces are antagonistic to each other, the language and logic used in their advocacy would lead the unsophisticated to think differently.

Agassiz replied to an offer of \$100,000 for a few lectures that he had no time to make money. Most people have no time to devote to anything else, unless it be of a sporting or gossiping nature.

Nineteen hundred years of Christian warfare (by reason of a wide gap between its practical and theoretical standard) presents the sorry spectacle of human conduct being more influenced by commercialism (selfishness, if you will) than any higher motive.

Modern commercialism strides forth uncondemned, because of its universality and want of a true understanding of its character. Men accept it as they do the sunshine and the rain, as has been true even of slavery and polygamy when contributing to the ease and bank accounts of its devotees.

The best legacy to leave the boys and girls is a good ancestry. The prudent farmer, from the standpoint of dollars and cents alone, will do as much for his cattle and hogs.

If our civilization means anything, it is that, regardless of cost, no child should grow up in ignorance. If it means anything of vital consequence to the race, it is that the earth and the fullness thereof is the heritage of the many and not the few.

The destiny of the old world was fashioned by soldiers and war. The proud warrior, steel clad, sabred and spurred, whose sole business was making cripples or corpses of their representative man. To such should belong the dead past, with all of its time-honored but exploded stupidities.

A few centuries ago nearly every one was ignorant, poor and uncomfortable. Yet the sun shone as brightly and the soil was as fertile and fruitful as now. Our ancestors got less from the earth than we do, because not so well educated.

Many people are poor for the reason that they are not trained so as to get their share of the good things with which this grand old world abounds.

The individual requires a higher order of intelligence to hold his own in the affairs of men to-day. And our government requires it of the many if it shall endure.

Having solved the problem of running a government without a king at the top, we discover the ignorant man at the bottom to be as great a menace and nuisance as the king.

From the landing of the Mayflower on Plymouth Rock to this moment the best American thought has ever been that every boy and girl on our soil shall have, free of cost, the best training the world can give. The dream of commerce and business, patriotism and poesy is a land full of good customers, intelligent, free and independent citizens, smiling, lovely, happy homes.

The more thought and intelligence connected with good business methods on the farm, as elsewhere, will bring better results, thus adding to the comforts and happiness of the home—home, the dearest word in the language, whose associations never fail to follow men, however distant they may wander from its portals.

In the home dwell the influences which form the habits and mould the character of its occupants. Great responsibility and care rest upon the parents of to-day, because of the temptations and dangers in sight of the home.

Were people as wise as they look and our government as beneficent as it is pretentious, most of the evils that strew our pathway with wreck and ruin would disappear "like the baseless fabric of a vision," yea, would be buried too deep for resurrection, and as an added security, would keep a strong guard over its miserable grave forever.

In this land of free schools should be taught ideas clear as diamonds and as broad as the planet. By the performing of noble and kindly deeds we can write our own patent of nobility.

The sweetest lay of the poet, the softest strain of the musician, and the endless note of the trumpet of fame are all for him whose life work illumines the pathway of his fellowmen.

Peace hath her victors, and victories more renowned than war, expanding into a thousand glorious virtues of which the ear has not heard nor the mind conceived, widening in its majestic sweep to gather all mankind into a loving brotherhood, where swords and spears will be converted into plowshares and sickles, with a peace conference, not of learned diplomats, tolling at so much per diem on the historic Hague, but in every human heart, echoing, like the immortal shot at Lexington, around the earth, and amidst the mighty thunders of a world's anthem of jubilee we behold, inscribed on its pure white banner, the loftiest and most inspiring sentiment that can thrill the human breast, "Peace on earth, good will to men."

HOW SHALL WOMAN ACCOMPLISH THE MOST GOOD?

MRS. J. J. M'DERMOTT, FRANKLIN.

[Read before the Johnson County Farmers' Institute.]

Who accomplishes the most good—she who leaves nothing undone at home, or she who devotes some time to social duties and self-culture? We might infer from the reading of this subject that woman could not fulfill all the duties she owes to her home, and still have some time for self-culture and social duties. We are very strong in our belief that our homes should be to us the most sacred and lovely spots on earth, for ourselves and our loved ones, and we who are parents should begin early in their babyhood to teach our children to love home, not merely as a place to sleep and eat, when they can go nowhere else, but as a place where father and mother dwell, a place where love, pure and clean, rules and reigns. And in this home, be it ever so humble, let the family room be the most pleasant and beautiful. In that room the father and mother should gather in the evening and early morning, the children and all the household about them, and read a portion of God's word, and all bow and be commended to the care of that all-seeing eye that never sleeps nor forgets. Thus fitted and fortified, we are in a better condition to go out into the world, to meet its duties and temptations, and to do the good we may as we go along.

And in order that we leave nothing undone at home, the wife and mother should be able to plan well and wisely the work for the day, giving each member of the household a portion of the work to be done, be it ever so small, and let each one be responsible for his or her part. We would teach the children to be cheerful as well as responsible workers. We can do this in a measure by having everything about us as convenient, clean and tidy as possible, and then we should make the very atmosphere about us cheery and bright. We should teach the children or servants how to do their work in the best manner; to be patient and not scold when they fail or make a mistake, but encourage them to try again.

By thus planning well, and all working up to the plans, we can have more leisure time for self-culture, which we must necessarily have, not only that we may govern, manage and beautify our homes, but that we may intelligently meet the demands society lays upon us. We have no doubt but some benefit may be derived, along this line, by some of the many clubs that have come into existence at the present time. Some of the literary and farmers' clubs have been the means of much thought and study along their lines, broadening our views and understanding, making us more intelligent thinkers, talkers and workers. We do not think that any

club or organization should interfere with our home or religious duties. "These things ought ye to have done, but not to leave the other undone." We should cultivate the spirit of sociability. Some of us live such narrow, close lives, we know but little outside of a small circle of friends or neighbors—scarcely enough to make tattling interesting.

We want to broaden our lives; to get out of ourselves; to see more of this great big world we live in. It is a good plan, we think, to lay by a little sum that we can draw on, and take a day or two off from home, from care, from work. If we can do no more, we should go to our capital city, visit the State House, some of the asylums, a greenhouse, the market, some of the large stores and, if we are tired and hungry, go to a good restaurant and eat our dinner while we rest. If we will then take a street car and go out to Crown Hill, or to some of the beautiful parks, it will be restful. We will then be ready to start for our home. I am sure we will realize that we have gotten information we could not get from books or otherwise. Now, we want to carefully and intelligently rehearse all we have seen and heard worth remembering to our friends at home. Thus we may be imparting knowledge to them, or at least we can help them to see things through our eyes, and at the same time we are cultivating within ourselves the rare gift of a good conversationalist. I am sure with such an experience we would be encouraged to lay by a larger sum to take a longer vacation, to see more of this world God has made so beautiful; and He has put into the heart and brain of man to increase the beauty and splendor of much we see and enjoy here. Those of us who visited the World's Fair will call to mind the most wonderful display of both nature and art. Who of us would sell our experience there and have it wiped out of the book of memory forever? How much more intelligently do we read, hear or speak of the wonderful things brought to our view and understanding while there at that time. I wish that every young person, and older one too, could make at least one visit or take one trip to Washington—our great nation's capital. We were exceptionally favored in our visit by having friends living there who took pleasure in helping us to see and enjoy the historical as well as the beautiful things of that wonderful city. One has a peculiar feeling of interest, or ownership, as he views the magnificent government buildings and all that pertains to them; "for are we not a part of the government?" Although you have taken a ride five hundred feet in the elevator up in the Monument, and viewed the city and surrounding country on all sides from this height, you will not be satisfied until you take a ride on the Potomac out to Alexandria and to Mt. Vernon, Washington's old home. While there, we strolled over the beautifully kept grounds out to his gardens, down to the stables, looked into the carriage house, at the old carriage standing where he left it, and, going, into the house, we were shown through the different rooms. We looked at the beds and the other furniture, standing where it was left by the family. Passing out and down to the boat landing, we stopped, and with quiet solemnity we looked at Washington's tomb, his last rest-

ing place. We then visited Georgetown, Cabin John's bridge, Arlington Heights—there we saw the graves of many of our brave soldiers—one of the most beautiful spots on earth. Still we were not satisfied. We wanted to see the old "Ocean." So we took a steamer down the Potomac, through the Chesapeake Bay to Norfolk, Virginia, and there by rail to Virginia Beach. There we bathed in the ocean, walked in the white sand, picked up shells and watched the great billowy waves as they came rolling in, lashing the shore, bursting, retreating out of the way for another—so it seemed to be going on through eternity. We were reminded of the words of John, the beloved disciple, when he was alone on the Isle of Patmos, a prisoner, surrounded on every side by water; old and weary, looking up into heaven, he says, "There will be no more sea." We, too, were tired; and from there we came home.

Now, dear friends, you will doubtless think we have gotten a long way from home, and from our subject, trying to illustrate some of the ways of self-culture. We feel sure that one can accomplish just as much good by getting out from home occasionally and learning not only of the good things others see and enjoy, but also of the real wants and needs of others, and how we may best lend a helping hand. Are we not in a measure "our brother's keeper?"

Our Saviour's last command to His disciples was, "Go ye into all the world, and preach the gospel (good tidings) to every creature." What is that "good tidings" but to tell of the Savior of the world, who has gone on before, to prepare a home, a beautiful mansion, for all his children? After all, a home is not so much the place as the people who live there, and she who can be an instrument in God's hands of bringing the greatest number of souls into His kingdom is the one who accomplishes the most good.

CHAIRMAN'S ADDRESS.

J. S. PFRIMMER, BRECKENRIDGE.

[Read before the Harrison County Farmers' Institute.]

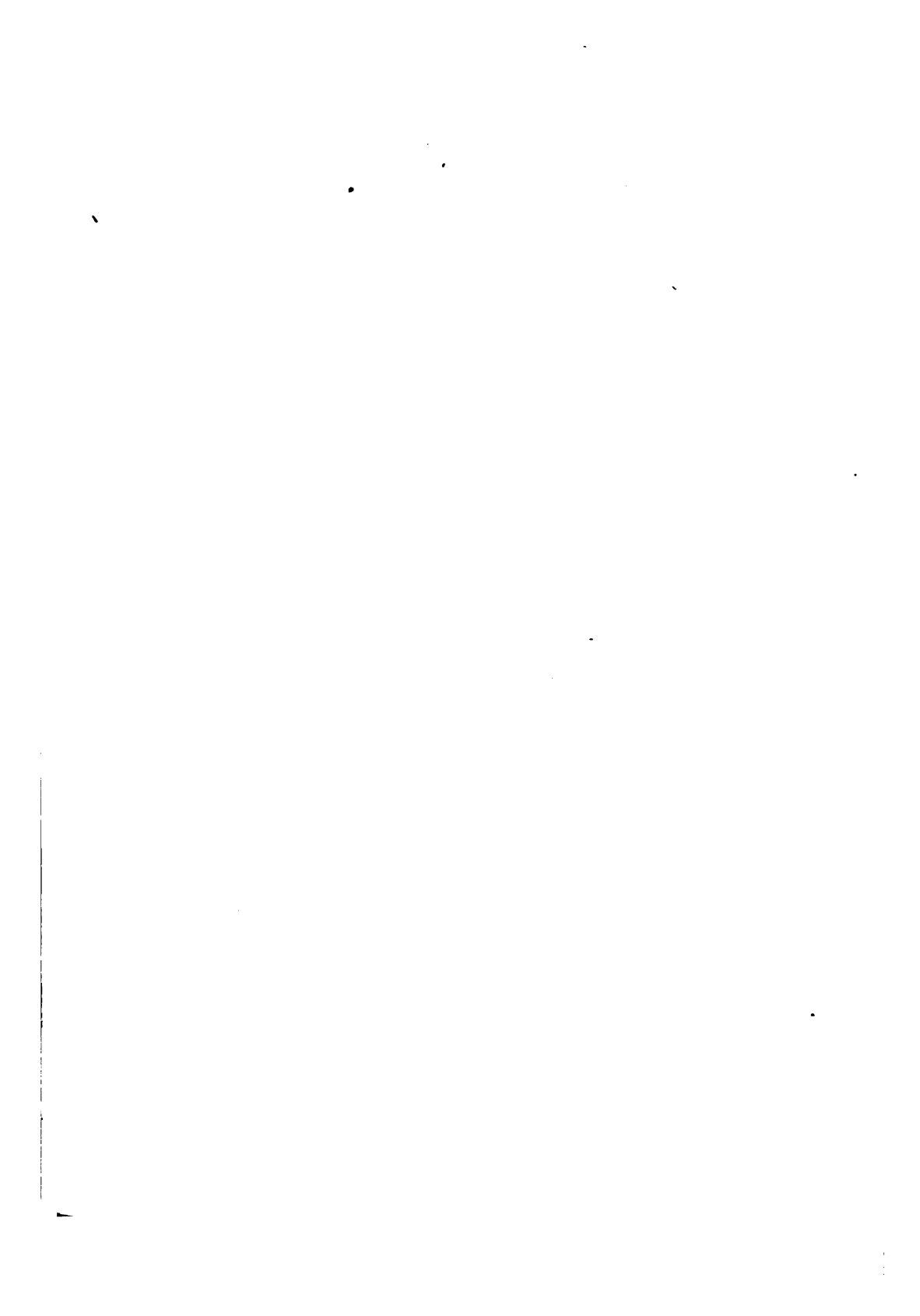
Another year has passed since we met as farmers to take into consideration matters pertaining to our chosen profession. I am pleased to notice that our farmers are putting into practice things learned in our institutes in former years, and are showing a disposition to learn more from the same source. The only regret that I have in this regard is the limited number of our farmers that avail themselves of the opportunity that presents itself at these meetings. An investigation shows that over 75 per cent. of the farmers of Indiana do not know at this time that we have an

agricultural college in the State. Perhaps, instead of saying farmers, I should have said of those that depend on the cultivation of the soil for their existence.

Don't try to laugh this off and say it is a mistake (as was done on a certain occasion), but go to work and investigate for yourself. A few days ago, in order to try to bring farmers to this institute, I took a trip through my own township—a township that is considered fully up to, if not above, the average in our county—a township in which there is not a name on our delinquent tax list. To the first fifteen I met, the question was put, "Have we an agricultural college in Indiana?" and all answered, "I do not know." Now, this condition should not be permitted to continue. A little circle of us here in the center of the county should not go on from year to year enjoying the benefits of the institute work and the great help that is coming from our agricultural experiment station without making an effort to extend the work. If we will only second the efforts of Professors Latta and Plumb, who are heroically working on this line, great good will be accomplished.

The game laws of our State up to this time have all been enacted in the interest of the sporting fraternity. The boy with his pocket knife can make a trap to catch quail, but in so doing he becomes a violator of the law for three hundred and sixty-five days in the year, while the sportsman is turned loose with dog and gun for a season and kills what the boy might have caught. But we do not want the boy to trap them. We want them let alone for at least five years. We want to see whether they are a benefit to our crops or not in destroying bugs and worms that infest our fields. And another good may be accomplished in that time: The sportsman in the five years may become civilized to the extent that he may live among us and become a good citizen. I say this advisedly. The man that can raise his gun and shoot a quail (or any other game, for that matter) just to see it fall or die, for sport, is not civilized. I would recommend that our Committee on Resolutions take our game laws under consideration.

To the lady (Mrs. Erwin) and the gentleman (Mr. McMahan) whom our superintendent has sent us, I will say for the farmers of Harrison County, that we bid you a hearty welcome, and hope that your visit may not only be a pleasant one to you, but a profitable one to us; and you must pardon us if we show a little weakness on our old stone capitol building, and our grand old constitutional elm, for every stranger that comes to Corydon inquires after these old landmarks, and we have come to the conclusion that they are worth preserving.



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